THE IRON AGE

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Plant Making Small Weldless Tubes

Specially Designed Mill with Rapidly-Adjustable Piercer for Product 1½ to 3½ In. Outside Diameter— Twelve-Roll Straightener a Feature

INCREASING use of seamless steel tubing in the automobile and the engineering trades has created a demand for mechanical tubing of small diameters, and exacting specifications that has warranted an attempt to design and construct a mill especially adapted to these requirements. With this thought, the Weldless Tube Co. was formed. The equipment was designed to produce, within less than usual commercial tolerances, hot finished and cold drawn tubing for locomotive and merchant and marine boiler flues, arch pipes and superheater tubes and all classes of mechanical tubing in sizes from 3½ in. to 1½ in. outside diameters, with wall thicknesses from ½ in. to No. 18 gage.

Ground was broken for the plant July 10, 1922. All machinery was specially designed and built, and the plant completed, and the first tube rolled March 19, 1923. The mill is on a 114-acre tract two miles south from the center of the city of Wooster, Ohio. The site has both Pennsylvania Railroad and Baltimore & Ohio sidings upon it, and directly connected to the mill, serving both the receiving yard and the shipping floor. The western boundary of the property is Killbuck Creek, providing an ample water supply and drainage. As the location is in the Wooster oil field, natural gas for the furnaces is supplied from local wells.

The main building is 110 ft. wide by 500 ft. long, of steel and glass construction throughout. A 60-ft. by 150-ft. billet yard runs along the receiving end of the mill. The pickle house is a separate building 150 ft. from the end of the main building, and is 45 ft. wide by 110 ft. long, of wood construction, with a steel crane runway. Two industrial tracks connect the pickle house with the main building. By making the pickle house a separate building the pickling fumes are kept out of the main building.

Electric power is purchased, and natural gas is used throughout in the billet heating, intermediate reheating, annealing, pointing and swaging furnaces. This is the best known fuel, being easily and cheaply handled and controlled, and is a big factor in the successful operation of the plant, as so much depends, in the process of making and treating weldless tubes, on having the steel at the proper temperature.

The billet yard crane is of 5 tons capacity, and the craneway overhangs the railroad siding. There are

Piercing Mill and Motor Drive Through Gear Set, with Heating Furnace in Background. Before entering the piercing mill, at right, the short billet passes through a centering machine, producing a "center" about ¾ in. deep, which facilitates the operation of piercing

two cranes of 5 tons capacity in the main building and one of similar capacity in the pickle house.

Starting at the billet yard the important equipment is, briefly, as follows: A cold shear to cut the 2¾-in. to 3½-in. billets from about 30-ft. lengths into short lengths for piercing; a machine for centering the billets before entering the piercing mills; this "center" or hole, about ¾ in. diameter by ¾ in. deep, allows the piercer point to be "forward" or up further in the piercing mill, which makes for better and easier piercing. The charging platform for the billet furnace is in this yard, as well as a platform scale for weighing the billets.

Located in the end of the main building nearest the billet yard, the hot mill unit consists of billet heating furnace, piercing mill, rolling mill, two reelers, reheating furnace, reducing mill and cooling table. A straightener, cut-offs and test benches follow in line for hot finished product, all connected by skids and conveyors. The arrangement is, in the main, the usual hot mill layout, but with several noteworthy features in design. One excellent characteristic of the layout is that hot finished tubes can be made and finished without being handled by a crane until after the hydrostatic test.

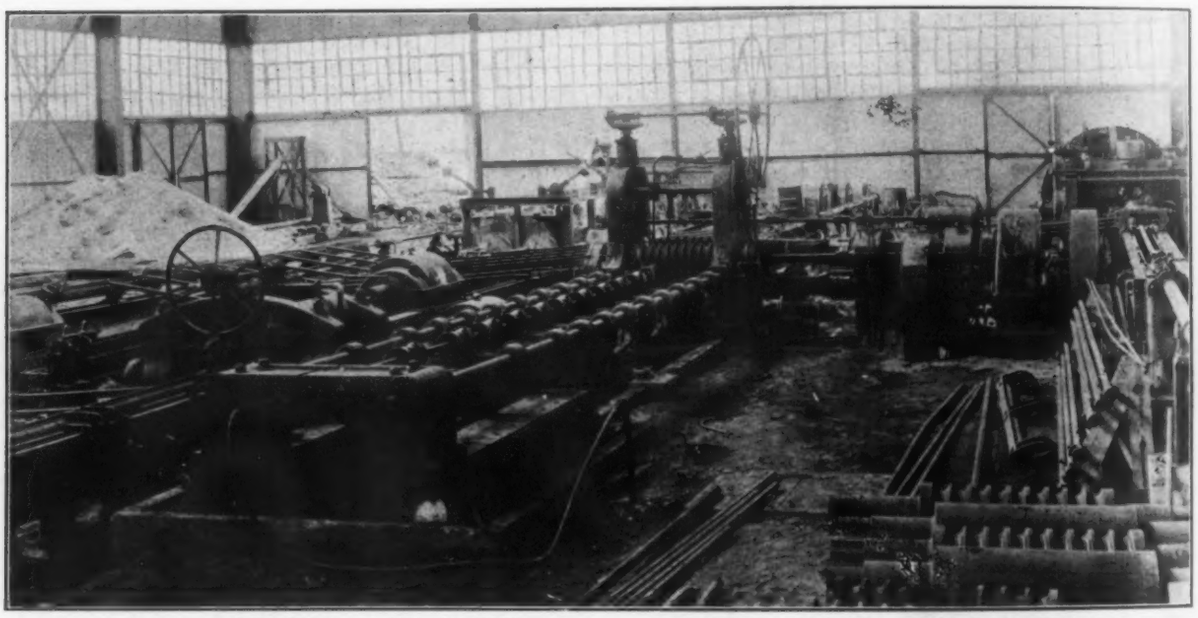
The mill was designed to produce 3½ in. tubes, the idea being kept in mind to produce that size and smaller only on this mill, with the minimum of labor and at high speed. The whole unit is speeded up considerably above usual practice. This is possible partly because the mill is designed for the size it is producing and is not a big mill making small tubes.

Perhaps the most important feature of the mill, and one which helps its speed, is the fact of the quick adjustment of angle possible on the piercing mill rolls. This adjustment can be made at any time within 5 to 10 min. instead of half a day or longer as on the old style piercing mill. This and other features are patented. With this angle quickly adjustable, depending on wall thickness to be made, the mill is kept up to its capacity, instead of running slower than might be possible, on account of the time involved in changing the angle.

The piercer point is long and quite pointed, and can be kept well forward in the rolls on account of the "center" in the billet, before mentioned. This shape of point also lends itself readily to reclaiming by forging. The pierced billet is a remarkably smooth tube; it shows a slight spiral corrugation on the outside, but that it is smoother and more uniform in wall thickness than any heretofore produced is the opinion of all who have seen it.

Another important feature of the piercing mill is the arrangement by which the rolls may be spread rapidly, and the upper guide raised to facilitate the removal of cobbles. This is accomplished by a motor mounted on top of the housing and connected to screws through a train of gears. A dial shows the spread of the rolls, which can be opened and returned to their original position in a moment. The same mechanism raises and lowers the upper guide. The piercing mill, while very sturdy, looks small compared to the clumsier mills of older design. This compactness is due to careful design and attention to detail. The rest of the hot mill machinery is of conventional design except that the mill is speeded up, as mentioned before, and the same care in design and construction has produced a good looking and efficient mill.

The straightener, in the line of conveyors from cooling table to cut-offs, is a departure from the usual cross roll straightener in small mills, in that it is of the 12-roll type, the axes of the rolls at right angles to the axis of the tube, the first and last four being in a vertical plane, and the middle four in a horizontal plane.

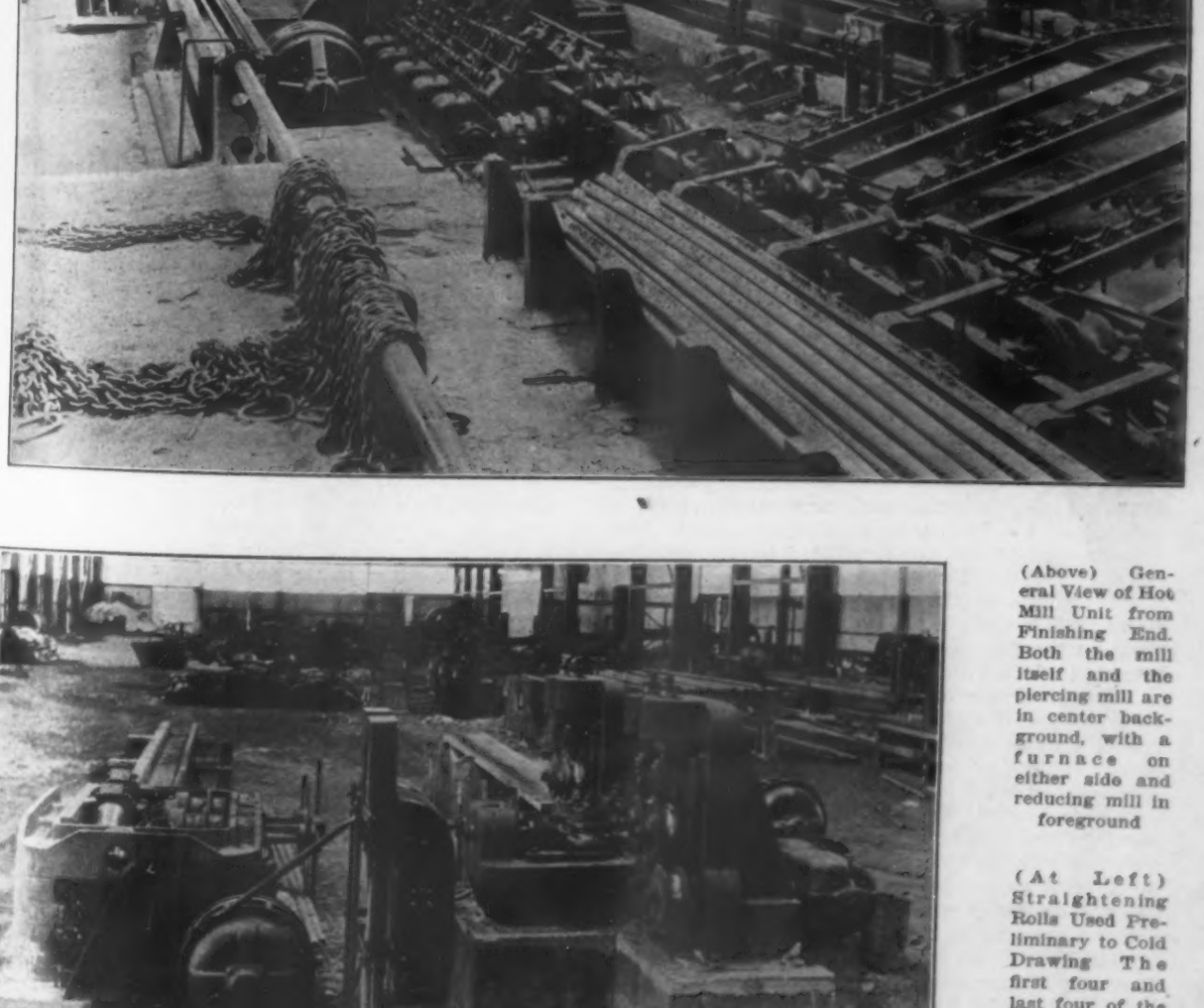


Hot Mill in Center, with End View of Piercing Mill at Extreme Right and Hot Mill Drive and Gears in Right Foreground. The end of a depressed reheating furnace appears at left of the hot mill, while a portion of the billet yard may be seen through the open door

The reducing mill, which can be used as a sizing mill by inserting conveyor rolls, is especially well designed, particular attention having been paid to ease of alinement in setting up, to lubrication and to cooling. Each stand has a different gear ratio, thereby taking care of the increase in speed in the gearing rather than in the rolls, as is the case where four stands have the same speed. Grease is forced through a cylinder by air pressure and piped to each bearing, the turn of a stock cock lubricating the bearing at will. This same lubricating idea has been used through the mill.

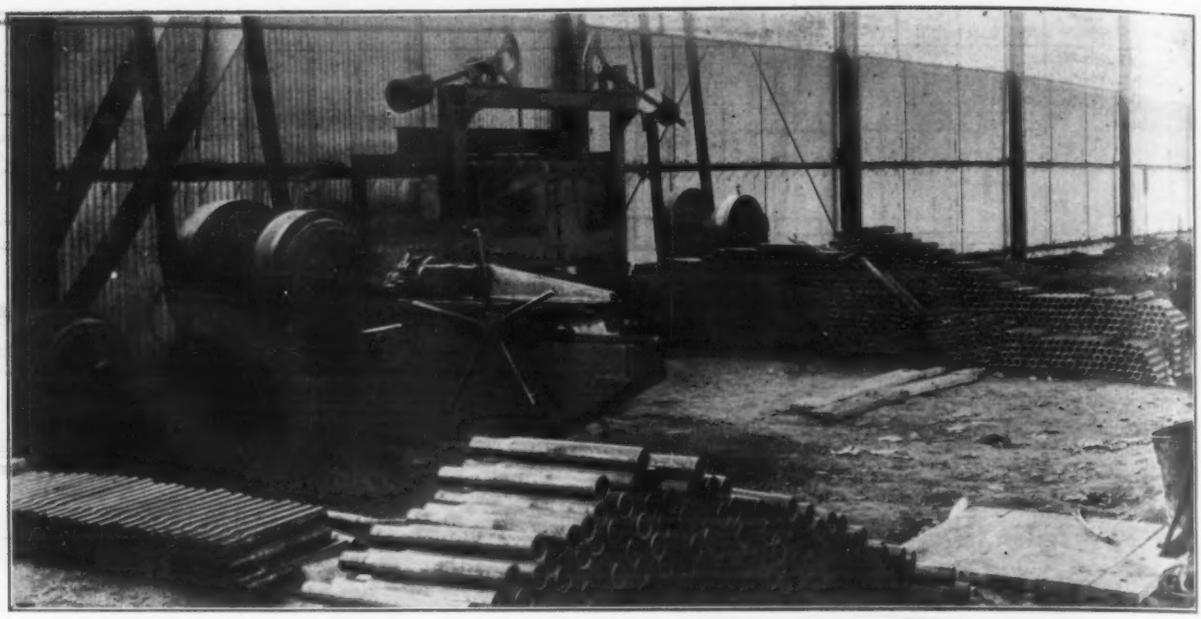
The cold finish department occupies the other end of the main building, where are installed four drawbenches of two chains each, pointing hammers, a duplicate of the straightener before mentioned, a cross roll straightener and shipping scales. The pickling and annealing are done in a separate building, already described.

Two of the Four Two-Chain Draw-Benches in the Cold Finish Department, Which Is in the Same Building as the Hot Mill Group but Occupies the Opposite End. By placing both departments under the same crane runway, handling of material in process of manufacture is greatly facilitated



(Above) General View of Hot Mill Unit from Finishing End. Both the mill itself and the piercing mill are in center background, with a furnace on either side and reducing mill in foreground

(At Left) Straightening Rolls Used Preliminary to Cold Drawing The first four and last four of the twelve rolls have horizontal axes, while the central four have vertical axes



One Corner in the Tube Forming Department, Showing Housing Wheel Carrier Tubes. The special short heating furnace is noteworthy

A fully equipped forming department is installed, designed for hot and cold swaging of mechanical tubing, such as axle housing tubes.

All of the mill equipment was designed by the Mackintosh-Hemphill Co., and built at the Woodard plant of this company at Wooster. The electrical equipment was purchased from the General Electric Co. and cranes from the Alliance Machine Co. The buildings were fabricated and erected by the Massillon Bridge & Structural Co.

LARGE TAX REFUNDS

Uncertainty as to Effect of Decision on General Situation

WASHINGTON, May 15.—Treasury officials have been unable even to approximate estimates of tax refunds that will be made to corporations as a result of a decision announced last Thursday by Commissioner Blair of the Internal Revenue Bureau, which declared certain kinds of corporation dividends are exempt from taxation as income. It was stated, however, that the Treasury will be called upon to refund many millions of dollars as a result of the ruling. The decision is an amendment which reverses the previous practice of the bureau and relates to tax regulations covering distributions out of earnings or profits by holding corporations accumulated prior to March 1, 1913. Heretofore it was held by the bureau that profits or earnings reported by a corporation to its holding or parent company lost their identity and consequently when distributed as dividends were taxable as income. Under the amended ruling, funds created by the subsidiary company through the holding corporation will be followed through to the stockholder who, the decision states, will not pay a tax on it, although limitation is made on the distribution of such earnings by the new language which reads as follows:

"Whenever one corporation has received from another corporation distributions out of earnings or profits accumulated by such other corporation prior to March 1, 1913, or out of increase in value of its property accrued prior to March 1, 1913, and the receiving corporation, after having first distributed all of its earnings and profits accumulated since Feb. 28, 1913, distributes to its stockholders the amount so received by it from such other corporations, such distributions are not dividends within the meaning of the revenue act and are exempt from tax."

The ruling is a part of regulations adopted by the Treasury Department for the purpose of collecting back taxes which have provided the Treasury with a great deal of money that previously had not been expected. While relatively it is small compared with the revenues of the Treasury, it has helped to turn what the Treasury thought at the first of the year would be a deficit, into a surplus.

Secretary of the Treasury Mellon estimates that there will be a surplus of more than $125,000,000, but his figures differ greatly from those of Director of the Budget H. M. Lord, who estimates that the surplus will be $65,000,000. The fact that there will be a surplus has encouraged hope of legislation at the next Congress making general reduction in taxes, which hope recently was thought to be entirely remote. The question, however, has not reached a point sufficiently definite to indicate just what the character of reductions will be, if any are made, although President Harding is represented as feeling that if any reductions are made in taxes, they should reach from the lower incomes to the higher brackets.

Rutgers College Made Mining Experiment Station

WASHINGTON, May 15.—The Secretary of the Interior has designated Rutgers College, New Brunswick, N. J., as the location of a new mining experiment station of the Bureau of Mines, which will specialize in problems involved in the production and utilization of the non-metallic minerals. These minerals include bauxite, cement, clay, feldspar, Fuller's earth, graphite, gypsum, lime, mica, phosphate rock, salt, sand and gravel, sand-lime brick, slate, stone sulphur mineral paints garnet, asbestos, and talc. The value of these non-metallic minerals produced annually in the United States is in the neighborhood of a billion dollars.

The choice of Rutgers College was determined largely by the fact that its location is a central one with reference both to the production and consumption of non-metallic minerals. The adjacent State of Pennsylvania alone has one and seven-tenths times as great a production of non-metallic minerals as all the States south of the Potomac and Ohio rivers combined. The New England and North Atlantic States, which are readily served from New Brunswick with a minimum of travel, have a combined non-metallic output of approximately three and one-half times that of all the States south of the Potomac and Ohio rivers. Furthermore, about 75 per cent of the industries consuming the non-metallic minerals production center in the large industrial cities and are within easy reach of Rutgers College.

Discuss Problems of Machine Tool Making

Spring Meeting of National Association Last Week Considers Economic, Commercial and Industrial Factors—To Continue Plan of Limiting Guests

MAKERS of "the master tools of industry" represented by the National Machine Tool Builders' Association, held their spring meeting last week at White Sulphur Springs, W. Va. They devoted themselves largely in their three days of meeting to manufacturing problems but set aside a session on Thursday morning for considering sales department topics. To this had been invited a committee of dealers and in preparation for this session the whole question of dealer participation formally and informally came in for discussion. Otherwise the meeting was like the annual convention last fall at Lenox, Mass., and the majority opinion was registered for continuing the type at least once more by voting to go again to Lenox for the annual fall meeting this year. The evidence was clear that a large number favor an arrangement providing for a joint session or sessions with so-called legitimate dealers, that is, distributers handling new machine tools, but a strong dealer organization was regarded as desirable and also conditions and place of meeting which do not offer too many diversions but do allow for concentration on both manufacturing and distributing matters without either group interest interfering at the moment with the other.

The Meeting Summarized

The view was expressed between as well as during sessions that meetings of the character of those of Lenox and White Sulphur are developing a closeness of acquaintance that was not possible in the larger meetings of former years. A large attendance of other elements than the manufacturer was described as surely to result, as in the past, in such a division of interests that the main objects of the machine tool builders' association cannot well be achieved. For the moment it may suffice to summarize last week's convention as bringing out these opinions:

That former meetings at which every one interested broadly in the industry was welcome checked the rapid growth of deep acquaintance among the makers themselves; that this fact resulted in the gatherings being marked more by mere camaraderie than accomplishment; that the association must capitalize the benefits of the past by continuing the practice instituted under the present management of focusing on both the underlying and the special features of the activity of the members as manufacturers, including an analysis of the economic as well as financial and industrial aspects of their business; that a better appreciation of the fact that machine tools are the master tools of industry is calculated to engender that respect which was said to be wanting both inside and outside of the industry and was responsible in part for its poor financial status; that a large part of the membership desires something in the way of joint meetings with dealers, provided individual maker-dealer conferences do not detract from the joint gatherings. Even the diverting recreation attractions of the last two meeting places seem likely to require recognition in the program, and unofficially it was said that at the Lenox meeting in the fall mornings may be left open for the golf enthusiasts and further that there may be competitions arranged along the lines of the committee divisions of the association; thus there would be the lathe tournament, the shaper contest and so on.

The White Sulphur meeting was the twentieth spring convention of the association. It was held at the Hotel Greenbrier, with sessions morning, afternoon and evening on May 9 and 10 and committee meetings on May 11. Outstanding were the address of President E. J. Kearney, Kearney & Trecker Co., Milwaukee, the report of General Manager Ernest F. DuBrul, an illustrated address by Dean Dexter S. Kimball, of the College of Engineering, Cornell University, and an impromptu address by C. Wood Walter, Cincinnati Milling Machine Co. There was also a scheduled address by C. A. Plaskett, acting in charge of container investigations for the U. S. Forest Products Laboratory at Madison, Wis., on "Making Better and Cheaper Containers for Foreign and Domestic Shipment." For directing informal discussions, a classified list of some 35 topics had been prepared by Mr. DuBrul, as had been the case at Lenox, and these helped to make the meeting one of unusual intensity.

The president's and the general manager's contributions were ordered printed for distribution to the membership together with a collection of charts which had been prepared by Mr. DuBrul to show certain statistics of the relative position among industries of the machine tool industry and which had been hung in the meeting room. The attendance was smaller than that at Lenox but whether this was a result of any disapproval of the new character of meeting or was caused by the relative inaccessibility of White Sulphur Springs to some industrial centers was not clear. Upward of 100, including ladies, sat down to the banquet Wednesday night.

Lessons Learned from the Long Period of Idleness

PRESIDENT KEARNEY'S address, which brought forth numerous comments of warm approval, was in part as follows:

The questions we should ask ourselves today are these: 1. Have we learned anything from the long period of idleness? 2. What steps can be taken in preparation for the next depression?

When the real slump came, it stole in unawares. There had been no cooperative compiling of statistics to show the rate at which the demand was decreasing, and maximum production went merrily on until there was an unprecedented inventory accumulated at high prices, and finished machines, regardless of their merit, could not be sold at any price.

Lessons of the Period of Idleness

May not the following be considered as axiomatic in answer to the first question?

1. The demand for machine tools is subject to the greatest fluctuations, even greater than that for the most useless luxuries.

2. A continuous record plotted into a curve showing the fluctuations in volume of orders on a percentage basis, using any selected period as 100 per cent, is of the greatest value and would have saved millions in 1920.

3. The beginning of a period of depression is the wrong time to accumulate stock.

4. Price reductions have no bearing whatever on the sales of machine tools.

5. Idleness costs money, but is unavoidable from any knowledge that we now possess.

6. The absence of substantial cash reserves with which to enter a long period of depression means price cutting, loss of self-respect, discredit among our competitors, humiliating pressure from banks, expensive re-financing, creditors' committees, or receiverships.

As to the second question: What steps can be taken in preparation for the next depression? the following may be mentioned:

Closer Cooperation with Dealers

First there is the matter of cooperation with dealers. A new concern, without any knowledge whatever of how to reach the user, may copy the design of an existing machine and get on the market in good times through the medium of the dealer. This is, in a large measure, responsible for the highly competitive conditions and the low prices that usually prevail in our industry. This is especially true of tools that are simple in design, such, for example, as upright drills and shapers, but extends throughout the entire line, though in somewhat less degree. When the runaway demand comes, the dealer finds that if he can make delivery ahead of competition, orders can be taken for tools of less reputation, or no reputation as compared with the machines that he has been selling. An ambitious mechanic is approached with offers to sell the entire output if only a start will be made. Equipment will be supplied on partial payments, the new product to be taken in lieu of cash. Thus a new competitor is launched with no knowledge of costs or prices except those supplied by the dealer out of scanty or biased information.

It is surprising with what complacence this operation is viewed by the busy manufacturer when it means the division of sales effort with an inferior and cheaper tool, which has but one tendency when the peak is passed—fewer sales and lower prices for the high grade product. The manufacturer who has spent years in building up sales connections should guard them jealously.

It would not be generous or in accord with public policy to set about trying to prevent the development of new competition on the part of capable and experienced men; but there should be more cooperation with the dealer in this regard, for the practice leads not only to weaken old established concerns, but to loss, disappointment and bankruptcy to the uninformed who make a start in boom times relying on promises that cannot possibly be fulfilled.

The manufacturer who relies on a dealer should see to it that the dealer relies on him. There should be mutual confidence and close cooperation for the good of both. This policy broadly and intelligently followed will help when the next slump comes.

There is another aspect of this same question that is of vital importance, and that is the abandonment of specialization in one line at the behest of some dealer who has lost out with some other manufacturer in a non-competitive line. There are some notable concerns that are making conspicuous success in manufacturing several lines of machine tools, but it will be noticed that they have in each and every case been in these lines for many decades. The successful specialist who has built up a great and honest reputation in his line may be taking on a real burden when he adds another at the request of friend dealer, as it may take years before there is a satisfactory return, and his effort adds to the difficulties of those already in.

Watching the Percentage Curve of Orders

A second way in which preparation can be made for the next depression is to get in the habit of closely following the percentage curve, showing in what direction the volume of new business is going, and at the first sign of a distinct downward tendency, decrease the volume going through the factory before it is too late to prevent the accumulation of a dangerously burdensome inventory, as was done in 1920.

It is to be regretted that there are still some who are not reporting the percentage volume of new orders, and consequently not receiving the charts. It is obvious that these reports gain in value, as the number reporting increases, and of course those who do not report and do not receive the charts are not getting the services out of the association that might be had for only a little effort on their part.

There has been some question raised by a member here and there, in perfect good faith, as to the value of the percentage volume charts just referred to, and to the general information bulletin of a commercial, economic or technical nature; but a still larger number has testified voluntarily to their worth, and has encouraged further study and progress.

Tribute to Work of General Manager

When Mr. DuBrul was first employed, it was expected that some of the lines of investigation undertaken would lead nowhere, and that in some things a fresh start would have to be made. He has met with noteworthy success, and is in demand to speak on economic subjects as applied to the machine tool business and has done so on several occasions, always setting forth the position of our industry—never failing to impress our viewpoint on the public addressed. He plans to improve and condense the charts and bulletins. He is energetic, honest, thoughtful and in dead earnest. If any one on earth can give us the timely warning that we will need as the next slump approaches, it is Ernst DuBrul, but he can only do this efficiently if we do our part. We should make it important business to see that he gets our reports promptly. In this way we will get our money's worth and be prepared for the next depression.

The third item in the list of things to do in preparation for the next period of idleness is to prepare for its cost. No argument need be advanced here today, or any details given, for the reason that our experience is all too recent. The deficit is not yet wiped out. The money that has gone and the debts that have come, both testify to the cost of idleness.

Using a Moving Five-Year Average Burden

Where will the money come from with which to meet expenses when the next slump comes. A plan was proposed, though not in complete detail, by Charles Oesterlein at the Cleveland meeting, Feb. 24, 1921, which to my mind comes nearer to a solution than anything yet offered. This plan, stated in its simplest terms, provides for the calculation of burden to be applied on the production hour basis over a number of years in place of a single year. If this plan were in use, the burden profit of the good year would be carried over into the next as a burden reserve, and so designated on the books. This reserve would be carried along from year to year until the slump came, and then be applied in the payment of the cost of idleness. If, for example, five years were taken as the period, each year a new burden rate would be calculated as a moving average of the last five.

Accountants will object to the plan because it does not fit their theory or practice. It is in effect the plan used by many banks in providing a contingent reserve for bad debts. They credit this account with a certain per cent of the gross interest collected, and keep it out of the profit and loss account. If there are a number of lucky years in which there are no large losses to charge off, the bank may take something out of the contingent reserve account and credit it to undivided profits or surplus.

There are a great many angles to this system of cost accounting that it will not be possible to discuss here, such as taxes, changes in the overhead rate per production hour due to improved tools, increased volume due to the growth of the business, and many other things. There is always opportunity for hair-splitting arguments, but all will agree that something should be done.

Exactly the same principle applies to selling costs. Direct sales cost little in good years and are expensive in dull years. Selling through dealers has a tendency to average the cost, but not entirely so. Burden reserve should therefore be of two kinds—factory and selling.

The burden reserve accumulated in the good years would reduce the amount standing to the credit of profit, and have a tendency, when rightly viewed, to keep dividends down to a safe and wholesome basis, prevent over-expansion, and generally steady the industry.

This method of accounting, if applied during the past five years by the concern with which I am connected, would have increased the apparent costs (the actual costs were the same in any case) over $500,000. Would that not have been a tidy sum with which to enter a period of idleness?

Price Dependent on Five Principal Factors

Necessary to a successful application of the foregoing is the obtaining of an adequate price during the buying period. Manifestly, the first step toward obtaining an adequate price is to ask it. That we are tending in the direction of one price to all without discrimination there cannot be the slightest doubt. In fact, the number who still follow the old practice, either occasionally or habitually, is very small; but like many another minority, they attract much attention, which is exactly what they do not want. They are unworthy of the respect of the honest buyer, and probably seldom get it. Few buyers of moonshine have any respect for their bootlegger.

If the assumption is correct that price cutting to one customer and selling at top prices to the trusting buyer is no longer followed by men of intelligence and common business integrity, we can devote ourselves to a consideration of the factors that enter into the making up of adequate price lists. The selling price of machine tools depends on five principal factors: Usefulness to the buyer, cost, competition, reputation and selling methods.

There is an increasing tendency among us, readily discernible, if you stop to consider it, to give first place to competition in establishing the price, when in reality usefulness to the buyer and cost are the main factors.

Futility of Pressing Sales Beyond Machine's Field

The uses to which a machine may be put are infinite in variety. For that reason a special, and perhaps exclusive feature, is of no particular value except to a certain percentage of the buyers. Let us say, for example, 30 per cent. Fixing our eye on competition and setting the price low enough to obtain 35 per cent of the business, may result in the total elimination of profit from the 30 per cent of the cases for which our machine is best adapted.

There is a place for the light, low-priced machine where it will answer the purpose just as well, perhaps better than a heavy one of higher price. The heavy machine in striving to compete throws away its profit on all sales, including those for which it is best adapted, by attempting to enter a field where it would not be found except as an incident, being used in part on work for which the light machine is ill-fitted.

The same principle applies to highly developed, as against simple machines; also, to machines of high accuracy and finish as compared with those in which these features are absent.

It is not possible for one shop to build all classes of machines in a given line, as, for example, heavy and light, highly developed and simple, accurate and inaccurate, for the reason that such a mixture could not be manufactured with the same shop personnel, and the concern attempting such a program would have a reputation based on its low grade product only, and therefore would have much difficulty in marketing the higher grades. This is no reflection on the makers of less accurate machines. They have their field, but the maker of the accurate product should not attempt to reach the price of the inaccurate, nor is it necessary.

There will always be honest misrepresentation in selling practice, for the reason that the maker of the less accurate machine does not, as a rule, fully understand the difference. The fields to which different classes of machines apply overlap each other, it is true, but making an attempt to establish a price for the higher grade, or heavier and more powerful, so that it will compete in the lower half of the field, is anything but wise, and results in no profit to any one.

Overdoing Design Competition

In machine tools, the real sport of the game is in design. The concern that brings out a new machine, or adds a new feature to an old one that will increase production or improve the quality of the product over that of previous standards, is performing a public service for which it should be rewarded. Usually the reward comes, unless the designers of that concern are so prolific in ideas that they do not finish the development of one thing until they are on to the next, and so never reach steady production; or do not stick long enough to production once attained to get the money back that has been expended on jigs, tools, and patterns. Overdoing design competition to the extent of making changes before a profit has been realized on the old is just as disastrous as price competition, so far as loss of profit is concerned.

Makers of the Master Tools of Industry

THE address by Dean Kimball of Cornell University was an inspiriting and informing review, illustrated by means of lantern photographs, of the developments of the mechanisms for metal cutting, being somewhat along the lines of an address which he delivered before a meeting in Philadelphia of the American Society of Mechanical Engineers in February.

One net result of the address is the likelihood of adopting a slogan for the association as "the makers of the master tools of industry." At the outset of the session of Thursday morning, the banquet being on Wednesday evening, C. Wood Walter delivered himself of what he called a brain storm but which proved to be an expression of the serious reaction he experienced as a result of hearing Dean Kimball. Besides the potency of the slogan as calculated to affect favorably the increase of respect of and for the industry, he touched on another matter emphasized by Dean Kimball, that these master tools contribute essentially to the universal well being. Yet, Mr. Walter said, future needs require an adequate supply of capital and it cannot be easily attracted by the conditions besetting the industry. Similarly there is need of an adequate supply of engineering and inventive brains and yet it is difficult to keep such attracted to the industry. Likewise there is a need of an adequate supply of manufacturing brains and of workers.

The situation, he added, needs industrial leadership as much as it did a year ago. "If we are to continue to be proud of the industry, we must do two things. We must hold on to the self-respect which rightfully belongs to the makers of the master tools of industry, this fact itself supplying the determination to carry on, and we must also get the fundamental economic facts of industry and, in accordance with Government advice, conduct our industry on a sound basis derived from a study of the facts each company can secure independently for itself." Thus he said there would be no fear for the industry as a whole.

He recounted such mistakes as using the automatic machine with its attendant complexity as a mere competitive weapon rather than as something which is essential in itself and he urged the need of increased efficiency in manufacturing and selling. "We can never carry on the traditions of the founders of the makers of master tools unless each one looks into the financial soundness, resources and strength of his enterprise."

Dealing with the matter of self-respect in the machine tool industry, the discussion at one time also revolved around the giving of engineering service, commercial service and the selling of a demonstrating machine as a used machine. It was thought that one could not expect to get respect with indiscriminate giving of engineering service or of repairing a machine for damage for which the builder was not responsible. Such attitudes are calculated to engender the idea of fear for the character of machine. It was emphasized that it would be a great step to have a service depart-

ment and charge a regular rate for the work. It was not regarded as right to market a machine as used if it had hardly had any use whatever, such as a machine from a stock of a company in liquidation.

Committee Reports

Some of the committee reports indicated progress and also a waiting on the work of other associations pursuing the same subject, the waiting serving to avoid a duplication of effort. This applied to the safety code work for which the association's representative on the American Engineering Standards Committee work is now D. K. Bartlett, Diamond Machine Co., Providence. It also applies to the committee on code of ethics and the committee on cancellations and contracts, the latter observing in particular the activities of a committee on the subject of the Chamber of Commerce of the United States. Members were reminded that in the recent past the cancellation evil has not been conspicuous, a machine being commonly in a car probably in less than half an hour after the order is received. As a cure for "cancelitis," however, it was suggested that a certain percentage of the purchase price might be demanded, called the cancellation charge or liquidated damages, but it was admitted there was still the problem of the dealer overstocked with machines, bringing up a special problem which involves some consideration with a dealer organization.

The committee to cooperate with the Department of Commerce described the work of the bureau of simplified practice under the head of W. A. Durgin and the industrial machinery division of the Bureau of Foreign and Domestic Commerce, under the head of W. H. Rastall. J. Wallace Carrel, Lodge & Shipley Machine Tool Co., James Gleason, of Gleason Works, J. E. Andress, Barnes Drill Co., Rockford, Ill., and Mr. DuBrul visited the department on Nov. 22, 1922. Mr. Carrel gave an extended report of the simplification and standardization work being encouraged under the direction of Mr. Durgin and recommended manufacturers working closely with Mr. Rastall in respect to foreign commerce, indicating how losses have been saved through information about fraudulent dealers abroad and describing the index file of machinery dealers. The division has a survey of railroad shops in Latin America and one of machine shops in Germany, England and France is under way. It was emphasized that the division can be of great help and that the members should make free use of the service, probably through the general manager of the association, so that there may be some familiarity with the kind of questions which are arising.

Explanation of Five-Year Average Burden

President Kearney showed by a table on the blackboard how the application of the average five-year burden rate would work out. In the column headed, "Production Hours," would of course be the total number of production hours for a year, say 1,000,000. Corresponding the total burden might be $600,000. As the table was presented, the number of production hours in 1918 is given as 100 and the total burden $60 for each 100 hr., so that the next column, "the current burden rate," is 60c. per production hour. The total for the five years in production hours is 330, and the total burden $330, so that the average burden rate for the five-year period figures out as $1. The use of such a plan would result in the good year's providing a surplus or reserve out of which overhead expenses of the poor year could be met.

Calculating Five-Year Average Burden Rate

	Production Hours	Total Burden	Burden Rate	Gain	Loss
1918.....	100	$60	$0.60	$40	...
1919.....	110	85	0.77	25	...
1920.....	80	80	1.00	0	...
1921.....	15	50	3.33	...	$35
1922.....	25	55	2.20	...	30
	330	$330	$1.00	$65	$65

As one member commented, the opportunity to use a lower than the actual burden rate in the poor year might happily leave the manufacturer under the passing impression that he is not losing as much as he is, and that it certainly would put him in a stronger position than otherwise to take care of competition. In the last two columns of the table Mr. Kearney showed how the rates actually balance. In 1918 there would be a gain of 40c. per production hour or for the 100 hours $40. Similarly the 1919 situation would give 23c. over the actual rate for the reserve account or for the 110 production hours, $25. There is neither gain nor loss in the reserve account of 1920. In 1921 there would be a withdrawal of $2.33, or for the 15 production hours, $35 and similarly for 1922 a loss in the rate of $1.20, or for 25 hours $30. The gains and losses of the reserve balance for the five-year period, as indicated.

Mr. DuBrul felt that it was not safe to take less than four years for the moving average, having in mind the length of the average business cycle, and he suggested that possibly five years was the better length of time, that if longer than five years were taken, then conditions may be entirely different in the earlier years, as suggested himself by President Kearney.

Charles D. Oesterlein, Oesterlein Machine Co., Cincinnati, suggested in passing the possibility of general insurance, with such an institution as Lloyd's, as a stabilizing instrument, the insurer to take off the peaks of profitable times and to fill in the valleys in the periods of depression. The insurance rate for the machine tool industry, he added, might be quite high. As it is now the Government takes the money when there is any but does not fill in the bottoms.

Relations with Dealers

Among the subjects discussed with the dealers was the plan of dividing commissions between agents when shipments are made into the territory of one agent on orders taken by an agent in another territory. One manufacturer divided the 12½ per cent commission by giving 60 per cent to the dealer taking the order and 40 per cent to the dealer in the territory to which the shipment is made. Another said that a division half and half was made even on machines shipped from a dealer's stock. One of the dealers present said that he always asked for an equal division of the commission through independent negotiation conducted between the dealers but there were some special problems like the purchase of a machine before anything is known of its destination and cases of machines temporarily shipped to one point to be used later in an altogether new point. Out of the discussion came a decision to have the association's committee work up a recommended practice in this regard.

Another subject discussed at some length was the division of territory resulting in different dealers having overlapping territories for a line of machines and giving rise to many difficulties in the border places. It was also decided to try to work out a simplification of this question. It was designated as a large job but that the spirit existing is favorable to a gradual consummation of the desired adjustments. It was pointed out that it would not do to be arbitrary in making any such decisions; that they must be worked out to the satisfaction of all concerned. Among the dealers present were George Cherrington, of Brown & Zortman, Pittsburgh, and Mr. Wright of Colcord Wright Machinery Co., St. Louis.

The handling of second-hand tools offered in trade deals came in for some consideration. It was urged that when second-hand machines are taken under such conditions, the manufacturer is actually deviating from any one price practice. The belief was expressed that the day is coming when second-hand machines will be disposed of directly to the dealer in such machinery, just as such a practice is being encouraged among certain makers of automobiles. It was held that the crux of the situation is that the special field of the second-hand machinery dealer ought to be recognized as an independent division of the business and manufacturers of new machinery should not impinge on this field.

It was also pointed out that there are all kinds of users and that the machine which would be a social waste if attempted to be used by one buyer is on the other hand a useful instrument in the hands of some other metal-working plant down on the scale of industry.

It was also emphasized that the machine tool builder could well afford to watch some of the auction sales, as in times past, at any rate, he could have bought in at low cost machines which had never been used; that he is in the business of making money, he should see to it, at least occasionally, that some semblance of a proper price be obtained by bidding up on products of his own shop.

Prospective Markets

In respect to prospective markets for machine tools, not much hope was expressed for a large extended buying in the automotive trade, partly in the light of the high production which has marked automobile manufacturing, although it was expected that there would be a gradual increase in the amount of trucks produced. Demand for the railroads was admittedly latent, that tools are required more than men, but in view of the financial position of the railroads it is to be expected that they will be behind in the matter of buying as commonly as has been the case. Continued growth in demand is expected from the electrical machinery industry since the trend is still in the direction of electrification. In addition to these three general lines some account can always be taken, it was emphasized, of different domestic outlets, or in other words, there is always something coming up, such as the radio development.

Another one of the topics discussed at some length was the making of production guarantees to buyers of machine tools. The general opinion was that estimates rather than guarantees would be better but that if a guarantee is demanded the giving of it should be guarded so that it is clear that there are surrounding conditions which have an effect on a guarantee and are commonly beyond the control of the manufacturer, such as the degree of accuracy of the finished product, the hardness of the metal, the skill of the operator, the condition of the building foundations and the lighting of the shop. Action, however, was deferred so far as recommending any definite practice.

Association's Efforts to Forecast Machine Tool Prospects

THE report of General Manager DuBrul dwelt on the needs of industry to protect itself by the collection and dissemination of all the information possible within the law, drawing at length from the findings of the so-called Hoover committee on business cycles in this connection, and explained the basis of the monthly report he is sending to the membership covering basic conditions affecting business in general and the machine tool business in particular. What he had to say was in part as follows:

Controlling Extreme Demand Fluctuations

Since last October there has been a considerable increase in activity in the industry. According to our barometer, the average of percentages of orders of the members reporting has risen from approximately 25 per cent, around which point it hung from July to December, and registered 46 per cent for March business. April reports are not yet available at this time, but machine tool industry is still far from the booming condition that has existed for the last few months in some other industries.

As we read the signs of the business cycle, it is not likely that this condition will improve very rapidly from now on, because the activity of other industries is limited by the supply of labor, and until a more ample supply of labor is available we are not likely to witness much expansion of manufacturing facilities. The machine tool business necessarily shows its greatest activity when other industries are greatly expanding their facilities.

The figures on building operations indicate that the end of the building boom is very close at hand. Mr. Hoover advocated that all government and public works projects be suspended until the present building programs are out of the way. Some of our studies indicate that construction of industrial buildings predicts machine tool demand. It is very natural that as new plants are installed new machinery should be required for them. It is therefore significant that the figures on industrial buildings indicate no rising tendency. The high cost of buildings at the present time will likely prevent many projects heretofore contemplated from reaching the point of contracting.

Moreover, the outlook for mortgage rates is unfavorable. The rates are relatively high, and tending higher. It does not do for large industries to pay high rates for money with which to construct buildings on an inflated price basis, and later find that a deflation of values will prevent the earning of a profitable rate of return on these buildings.

Railroad buying has not been as large as it should be in view of the conditions of the railroad shops, which are very badly in need of much new equipment. But no matter how much they might like to have new equipment, the railroads do not buy it unless they can see good prospects of paying for it. The public attitude toward railroad credit has prevented their keeping up with the needs of the country, and with certain clouds on the political horizon, investors will not readily advance the funds that the railroads actually should be spending.

Forecasting Conditions

It has now been visibly demonstrated by statistics and charts that the machine tool business is one of the most irregular of industries, and is subject to longer and deeper depressions than the average. Therefore, it is of prime importance and should be of great interest to all machine tool builders to use every means available in forecasting conditions so as to keep their own individual business in a healthy state. The better forecasts all business men in the country learn to make, the less serious will be the swings of the business cycle.

It is the social duty of industrial managers to use every available means in making good forecasts. The growth of radicalism will become more and more marked unless these fluctuations are better controlled. The cumulation of the movements shown in the big swings is always the sum of the individual movements of individual business managers. Only by individual study and individual action can the excesses of the general movements be minimized.

In the fall of 1921, President Harding called a conference to discuss the causes and remedies for unemployment. It was soon recognized that the greatest distress of unemployment comes from cyclical fluctuations of business. Before the conference adjourned it appointed a strong committee to study the question of unemployment in relation to business cycles.

The committee found a scarcity of sound statistical and economic data on which the business administrator can base his judgment. They recommended that extensive investigation be made and widespread public interest be aroused to cooperate in supplying more information. Little can be done until fundamental facts on which action must be based are available in current and comparable form. Unless business men and trade associations at once begin investigation and study of these problems, solutions are more than likely to be attempted by other groups in ways that are unsound, unscientific and disastrous.

Many interesting facts as to cycles are brought out in the committee's full report.* In many industries men honestly believe that there was a lack of material or supplies and that prices would continue to rise in 1920. Yet, if full information had been available, it would have shown a surplus accumulation of speculative stocks of goods. Only when the insurance companies discovered that the amount of silk collectively insured was beyond the insurance limits did the silk people realize that there was an excess supply of silk, and not a shortage of silk.

The committee points out that the present buying habits of large elements ought to be changed; that

*Reviewed at length in THE IRON AGE, April 5, page 973.

they should be induced to buy from hand to mouth when a boom is on, and to buy in larger quantities in a period of depression.

Each Industry to Study Its Trends

Since the only means of absolute demonstration of conditions is through the use of statistics, the committee urges that much more statistical study be given to the trends of each industry. They point out that these studies should not be combined into so-called general business curves, but should be separately correlated one with another. If this were done, the business man could know:

1. The current facts about general business conditions throughout the country, and a knowledge of the probable future trend of general business conditions.
2. The basic facts that he should know about his own industry, because his particular business is influenced by conditions affecting his entire industry. To be in a position to study his own industry's peculiar problems, there must be cooperation of competitors and compilation of industry statistics.
3. The business man should secure enough facts about his own business to give him not merely dry statistics, but a proper basis for judgment as to his general policies.

It is important for industries to determine what are the proper financial ratios between sales, inventories, fixed assets, liabilities, etc. It is a cold fact that unless a business keeps within certain bounds, which vary with each industry, it is sure to get into trouble.

The monthly letter issued on May 1 by the Federal Reserve Board shows action on one recommendation that when prices are rising and business is expanding, bankers should ask borrowers to maintain an increasing ratio of quick assets to current liabilities. This policy would prevent speculation in commodities with borrowed funds and slender margins, which finally compel men to dump the commodities so held to the detriment of the whole price and credit structure. This recommendation has a very substantial interest for all machine tool builders whose own inventories are by no means a really quick asset on a declining market, as we all know.

Finally the committee recommends that every business man pursue the policy of systematic accumulation of reserves in times of prosperity, for use in expansion and improvement in times of depression. We sincerely hope that the customers of the machine tool industry will take this advice to heart and change the buying habits which now make the machine tool industry most irregular. In scarcely any other single industry can cyclical depressions be greater cause of loss than in ours. I urge members to get the full report of this committee, and study it. It is a large book, printed by the McGraw-Hill Book Co., New York.

It would greatly help the industry if every important element in it were to instruct salesmen, agents, dealers, and all who come in contact with its buying public to show just what these recommendations of the Hoover committee mean to the buyer himself. Each machine tool builder should do his share in controlling the business cycle. Much information comes into every office from various sources. As most business men have not the time to thoroughly digest all this information, we issue our "Monthly Review" of conditions affecting the machine tool industry, and point out the probable future effects of present conditions.

Reasons for the Association's "Monthly Review"

No factory can long produce a steady flow of goods to the limit of its capacity. For a short time a manager may experience this ideal condition, but he is sure to find that before long something or other is interfering with the desired flow. This is true for every industry as a whole. It is important that the causes of these interruptions be analyzed and classified in order to anticipate and if possible avoid them.

Dean Herman Schneider, of the University of Cincinnati, during the war attacked the problem by classifying reports of different causes of delay. He found that they naturally grouped themselves under seven general headings. These factors are: Capital, labor, material, equipment or buildings, transportation, fuel, and in some cases weather conditions.

The machine tool builder must forecast these few factors if he is to make a success. Naturally, some of them affect others, Lack of transportation will affect the supply of both fuel and material. If a plant cannot get outbound transportation to carry away machines that it has on hand, its customer will cancel orders and seek elsewhere for better deliveries. If the buildings or equipment are not sufficient to handle the amount of orders to be had by the selling department in a given length of time, customers will be lost to plants that can supply the demand. So, too, if lack of orders, material or fuel causes a shutdown or partial operation of plant, desirable workmen will go to a plant that works more regularly.

Our monthly review tries to point out the probable future effects of the present trends displayed by each of these elements, so that our members will not forget them in planning ahead. There is nothing in current literature that correlates these factors as a whole, and as they affect our particular industry, that deficiency is sought to be supplied by our monthly review.

FOUNDRY SURVEY

Labor Conditions Reviewed by Connecticut Manufacturers' Association

The Connecticut Manufacturers' Association has completed a survey of the labor situation in foundries of that State since 1913. It shows that earnings of common labor employed in jobbing foundries making gray iron castings where union labor is employed have increased 93.3 per cent since 1913. During April, last, the average weekly earnings of molders and coremakers were 125 per cent greater than in 1913.

The average daily tonnage during 1913 for all foundries investigated was two and one-half tons. During the war peak period, the average daily tonnage was 15, while at present it is six and one-half. Expressed in percentage the average daily tonnage increased from 1913 to the peak period 600 per cent, while the average daily tonnage today is still 200 per cent better than in 1913.

The average number on payrolls in 1913 was 26 while at peak times it was 88 and at present 47. In 1913 foundries were operated nine hours per day for 54 hours per week. During the peak period, they were operated eight hours per day or 48 hours per week. There is no piece work done in these foundries, all the work being paid for on a straight time basis. Straight time is paid for all overwork, except in cases of emergencies when time and one-half is allowed employees. Molders and coremakers receive the same rate of pay.

Weekly earnings for common labor increased 140 per cent from 1913 to the peak period, and in April, last, were 93.3 per cent higher than in 1913 and $4.80 less than in peak times. Cupola tappers in some foundries received the greatest increase in wages. In 1913, this class of labor received $2 a day or $12 a week. In the peak period, they received $7.20 a day or $43.20 a week, an increase of 260 per cent. Few apprentices are now employed in union foundries. Out of a total of 277 employees of all kinds at all plants, only four coremakers and three molders are working as apprentices.

The Pennsylvania Railroad opened team tracks at Fort Street, Summit Street and McKinstry Avenue, Detroit, on May 15. A 25-ton electric crane and other appliances have been installed and direct through freight service from the East was opened on the same day. The new Pennsylvania freight terminal will be ready for occupancy early in September.

Morgan-Connor Continuous Wire Machine

Operates on Flexible Principle of Looping Mill—Maintains Tension Without Slip—Survey of Development of Continuous Wire-Drawing

BY KENNETH B. LEWIS*

WHEN one who is familiar with modern steel manufacturing processes, with their continuous operation and automatic handling devices, makes his first visit to a wire mill he feels as though the calendar had been turned back fifty years. Material which he has seen submitted to 10,000 elongations from ingot to rod continuously and without a single foot-pound of direct manual labor is here reduced about 10 elongations non-continuously, at about the same cost, and by operations attended with the most severe manual labor. He sees steel in a form admirably adapted to continuous treatment, in very long pieces, of uniform section, reduced many times in one direction, but repeatedly lifted and carried from place to place by hand.

Continuous processes seem able to bring the raw material to the wire mill and to fabricate the drawn wire into finished products, but the wire-drawing operation itself resists every effort to bring it in line with modern practice. This condition is due not to any lack of enterprise on the part of the wire-mill management, but to difficulties inherent in the process. It is the purpose of this article to review these difficulties, the expedients proposed and tried to overcome them, and the reasons for their failure, and to describe a new drawing method which promises a solution of the problem.

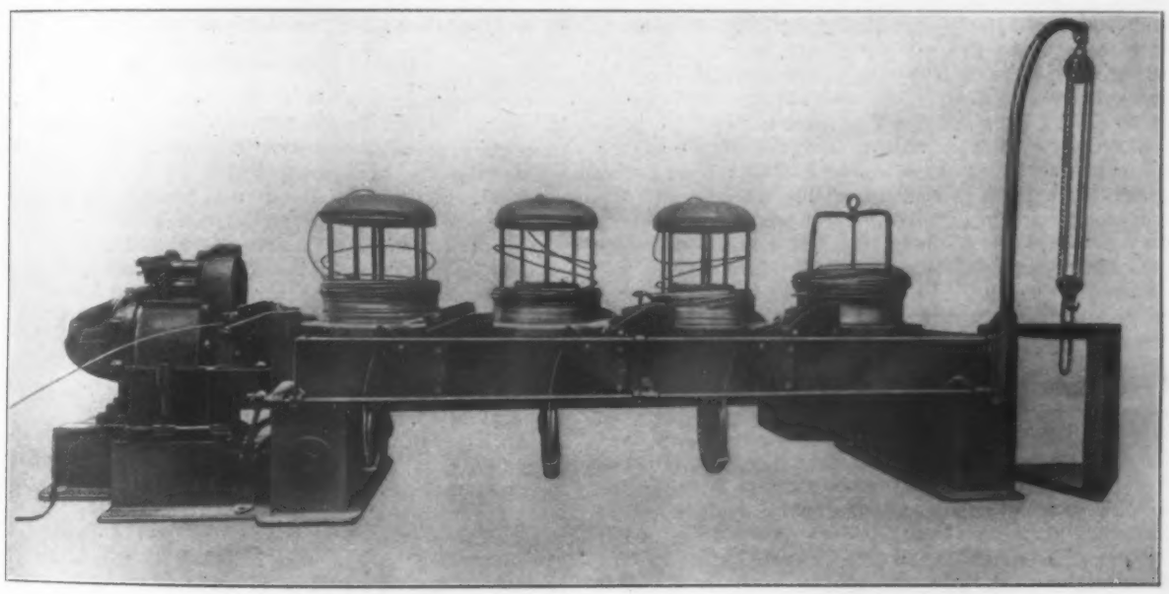
In analyzing the difficulties of continuous drawing it is helpful to make a parallel between drawing and rolling. We have, for instance, ordinary three-high rolling in which the whole bar runs out on the floor after each pass. This corresponds exactly to the customary single-draft process in the wire mill. We have straight continuous mills, whose successive pairs of rolls are speeded exactly right to compensate for reductions. Continuous wire-drawing machines as heretofore built are analogous to such mills.

There is, however, an intermediate type of rolling mill in which, although the operation is continuous, the roll speeds are related only approximately to the reductions. All stands are permitted to overfeed, the excess rod lying between stands in the form of loops, which grow slowly during the passage of the rod through the mill, and disappear abruptly when the end runs out. Such mills are admirably adapted to many requirements, since grooves may wear, or passes be changed to produce a variety of finished sizes without serious disturbance of the speed relations.

Distinction Between Rolling and Drawing

This would seem a particularly attractive principle to carry into wire-drawing, an operation in which wear in the dies is almost inevitable and in which frequent predetermined changes in draft and finished sizes are desired. This field, however, remains practically untouched, for the reason that the maintenance of free loops is impossible in wire drawing. Here is a clear distinction between rolling and drawing. In rolling, the reducing and forwarding functions are performed by one element—the rolls. In wire-drawing, on the other hand, the die reduces and the "block" or capstan supplies the power.

In the former art the metal is positively gripped and advanced by each pair of rolls without reference to any other pair. In the latter, the forwarding agent is a capstan with which the wire is in frictional engagement and by which the wire is advanced only so long as that frictional engagement is maintained—that is, so long as there is sufficient tension on the off-going end of the wire. The overspeeding of any capstan with reference to that next succeeding simply promotes a slipping backward of the wire on the capstan. The continuous wire drawer is between the devil and the deep sea. In the adjustment of speeds to drafts he can neither stretch the material, for it will inevitably break, nor can he maintain a loop.



In Operation the No. 5 (or 5½) Wire Rod, Coming from a Coil at the Left (Not Shown), Passes Through the First Die and Thence onto the First Block. After a certain amount has accumulated on this block it is led up through the chain around the head of the block and then over the cap and down through the central spindle. Passing under the sheave below the frame, the partially drawn wire then is led into the second die and thence to the second block; similarly to the third and the fourth blocks, being fully drawn to gage in its continuous passage from left to right

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In continuous wire-drawing, as commonly done, speeds are so related to drafts as slightly to overfeed all blocks, the overfeed corresponding to the amount of variation in die size that can take place without seriously affecting the process as a whole. As a result there is a slight backward slip on all blocks except the finisher. The speed adjustment is done in one of two ways; either the forwarding capstans are of the same diameter, and properly speeded by gearing, or the capstans are keyed to the same shaft, and their diameters stepped up. The wire makes two or more wraps around each capstan, going on and off the drawing surface tangentially. The slip-drive induced by overfeed gives a certain degree of flexibility to compensate for die wear, but is attended by evils which are serious enough to have kept continuous drawing out of all but a small corner of the field.

Lubrication in Wire Drawing

Steel wire is protected during its passage through the die by a coat of lubricating material, upon whose lasting qualities depends the success of the operation. This coating is built up during the cleaning, coating and making of the rods, and their passage through the first die, and no subsequent application of soap, grease or other agent can add materially to its value. This coating thins out and disappears after repeated drafts, and upon its quality depends the number of drafts the wire will stand before annealing. (We speak now of commercial soft steel.) The chief function of annealing is to prepare the surface of the wire for a new coating, and as this is a costly operation it may be readily appreciated that the establishing and maintaining of a good coating are absolutely vital matters.

Slipping of wire on the preliminary drums of the continuous machine is hard on the coating. Worse still, the driving surface is soon worn into grooves and the wire, unable to slip upward in the normal way, crosses over its own strands, damaging the coating still further. The drums must be frequently faced off in the lathe, with a consequent disturbance of speed relations, and the damage to the coating results in scratched wire, rapid wear of dies and much breakage and scrap.

Because of these conditions continuous drawing has been confined chiefly to two classes of product—nonferrous metals and fine steel wire. The nonferrous wires are too soft to wear the blocks excessively, and their coating is of such a nature that it may be renewed at each die. Copper in particular is an ideal continuous machine proposition. Fine steel wire lends itself to continuous treatment much more readily than larger sizes, for reasons too involved to discuss here. Briefly, the reductions are light, the contact with the drum is greater per unit pull, the wire is covered with a soft film of metallic copper and tin and the lubricant is liquid and can be re-applied at each die.

How to Save Time and Labor

The outstanding advantage of continuous over single-draft work is that the wire need not be lifted from the block after each draft. This saves time and labor. The saving in time may be counterbalanced in part by the added difficulty of "stringing-up," but the labor saving is net gain. In fact, in the drawing of wire rods to the most common gages of wire, a job for which the labor supply is nearly always below the demand, a man's daily production is limited not so much by his inability to attend more units, as by his unwillingness to lift more pounds of wire in a day. Having determined the number of tons he can lift without permanent injury, he adjusts his routine to this standard. It is in the coarse sizes that wire is handled in heavy bundles, and lifts are frequent, and it is unfortunately in just these sizes that the evils attendant on straight continuous drawing are most serious.

This condition has engaged the attention of inventors for years. Their researches have been in two directions:

1. Granted that slip is a necessary evil, how may its bad effects be avoided?

2. How can the slip be prevented, or transferred to some part of the mechanism other than the drawing surface?

Under the first head, efforts have been made to find some substance too hard to be cut by the wire, and too smooth to injure it. Nothing practical has come of these efforts. Under the second head measurable progress has been made in three distinct directions.

In one class of machines, a typical example being those developed some years ago by James Horton, the drawing surface is made up of loose copper segments sunk into a tapered groove in the block-face. The segments fail to complete the circle, there being spaces between their ends. The tension of the wire pinches the segments together and sinks them deeper into their groove, bringing them into driving contact with the sides of the groove. The potential "loop" allowed in the speed calculations causes slackness, and permits the segments to spring out of driving contact. This frictional engagement is delicately and automatically adjustable to varying conditions, and the wear is transferred to the easily replaceable segments.

Such machines have had extended trial and are still in commercial use in France and England where, for reasons which do not concern us in America, it is profitable to make some concessions in the way of power consumption and maintenance charges. Their chief weakness is that the slip generates enough heat to ruin the coating on the wire unless the blocks are cooled by water jackets or air jets. The amount of power wasted in this way is surprisingly large. Other ways of transferring the slip have been proposed and patented, none of which have been of commercial importance.

Use of Differential Gearing

In a second class under this heading are machines in which the difference between the actual and the theoretical speed of the wire is taken up by differential gearing inside the blocks, which, in connection with ratchet drive, provides the desired compensation for die wear in a manner difficult to describe in detail. Typical machines of this class are those developed under various patents by Hodgson, Oslund*, Slinger and Barron & Crowther. They have enjoyed a moderate degree of success in certain kinds of work in medium sizes, but have not as yet established themselves in coarse wire. Their weak points will be readily appreciated—complication, high first cost and maintenance difficulties are inherent in their nature.

An interesting proposal along this line, also covered by patents, is that each block be provided with its own motor, so wound that its speed will vary inversely with the load, the idea being that extra tension on the wire at any point will reduce the torque demand on the preceding motor and increase its speed, so that tension on the wire will be in equilibrium at all points. This suggestion would be of more practical importance if the motor manufacturers could supply reliable motors of the desired characteristics at sufficiently attractive prices.

In a third class are machines with controlled loops, necessarily short, whose length fluctuates with the wear of the die, the loops being kept under tension by springs or counterweights. In some cases a change in the length of the loop actuates a speed controlling device, either a gear shift, friction clutch or belt binder or, in the case of individual motor drive, a rheostat. So far as coarse wire is concerned no machines of this class are in commercial use.

Machine with Flexible Looping

Reverting again to the parallel between rolling and drawing operations, it is clear that none of the continuous wire-drawing machines described corresponds to the looping mill. Such loops as are permitted are held under close control as to length and tension. The Morgan-Connor wire machine recently put on the market, however, based on patents granted to R. Duncan Connor, Manchester, England, and built by the Morgan Construction Co., Worcester, Mass., is the exact analogue of the looping mill, with all of its simplicity and flexibility, and promises to be one of the most interesting developments in this art in many years. The machine is shown in the illustrations, in which the

*This machine was described in THE IRON AGE, Feb. 9, 1922, page 416.

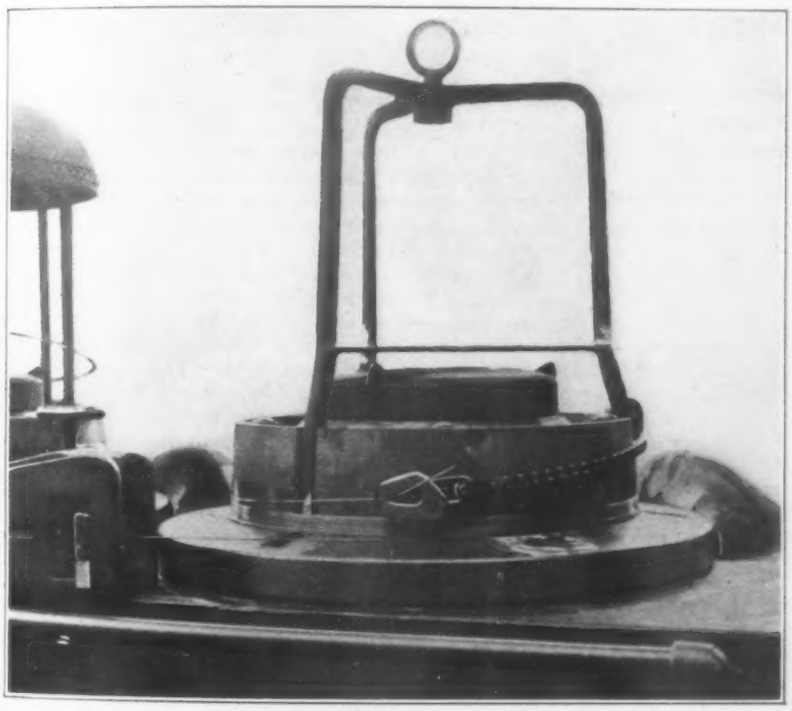
operating features are clearly brought out. The blocks are geared for a heavy overfeed at all points and the "loops" are held in storage upon the blocks themselves. This is made possible by leading the wire off each block by uncoiling as distinguished from unwinding. In other words the wire, which comes onto the block tangentially, goes off axially. There need be no particular relation between the speed at which the wire comes onto the block and that at which it leaves.

Wire accumulates slowly on the preliminary blocks, passing off through the hollow spindle at the rate determined by conditions at the next succeeding die, and a change in the size of the die-hole, whether accidental or predetermined, is reflected only in the relative accumulations on the several blocks. The block speeds can be figured to give, for known drafts, predetermined amounts of accumulation. With speeds once fixed, reductions can vary through a wide range.

For example, if the speeds are stepped up by 25 per cent increments, any drafting schedule involving reductions of 25 per cent or over will suit the machine. At 25 per cent reduction the blocks will make no accumulations—the "loop" will be free but will not grow. Greater reductions will cause accumulations which will vary directly with the difference between 25 and the actual percentage of reduction. The machine illustrated, for example, is geared for 25 per cent reductions and, in drawing 300-lb. bundles of wire from No. 5 to No. 14 gage makes average accumulations of 36 lb. on each block. The average reduction is 37 per cent; 37 minus 25 leaves 12; 12 per cent of 300 lb. is 36 lb. On plow steel rope wire, average reduction 28 per cent, the average accumulation is 9 lb. per block on a 300-lb. bundle. The machine can therefore without change handle any grade of wire. The process has been aptly described as "single-holing continuously."

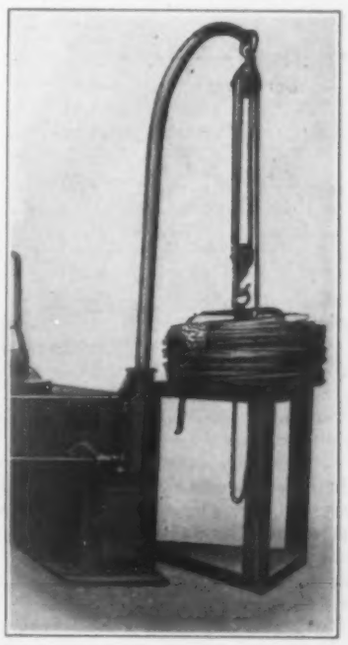
Maintenance of proper tension on the wire is no less necessary in this than in other machines, but there is so much more wire on each capstan that the tension need not be great. It is found in practice that, so long as the upper end is not actually free, there will be sufficient tension to draw wire without slip. A tension chain may be seen running in a groove on the "dome" of each block. The wire passes through one of the links of this chain on its way to the hollow spindle. The chain, sliding freely in the groove, has a degree of motion relative to the block which is a function of the difference between the pounds per minute received and the pounds per minute forwarded by the block. If reductions and speeds exactly check, the chain will be stationary with respect to the observer. With a 10 per cent difference the chain will make one revolution to each 10 turns of the block. This motion is most interesting to watch, and wear in the die may be detected by observing the relative motion of block and chain.

This system of forwarding wire from block to block obviously involves a certain amount of twist in the wire, the calculation of which is simple after the principle is grasped. When reductions match speeds there is no twist. The twist may be measured exactly by the relation between the weight of bundle and the total accumulation on any block. For example, in the instance cited above, No. 5 to No. 14 gage with 25 per cent speed increments, and 36-lb. accumulations, 36 is 12 per cent of 300 lb., therefore there will be one complete twist for each $\frac{100}{12} = 8\ 1/3$ revolutions, or approximately 50 ft. In practice it is found that the twist is non-cumulative, being presumably absorbed at each die. Even in so resilient a metal as plow steel rope wire no effect of the twist can be traced, either in the operation of the machine or in the tests of the finished product.



Above Are Shown Both the Method of Gripping the Wire and Thus Drawing It Positively Through the Die and the Form of Fourth or Final Block upon Which the Drawn Wire Accumulates and from Which It Is Ultimately Lifted

Below Is the Small Derrick Which Removes the Coil of Drawn Wire from the Final Block, Depositing the Wire on the Stand and Permitting the Tripod Carrier to Fall Through, Preliminary to Being Replaced upon the Machine



High-Speed Drawing

Continuous machines present the most attractive field for the development of high drawing speeds, for two reasons:

1. There are no high-speed pay-off reels on the floor, annoying and highly dangerous.

2. When the machine is threaded up and ready there is a long and uninterrupted run, during which high speed returns high production in exact ratio.

Drawing speeds in general are limited by two chief factors, the character of the start and the disposal of the heat generated at the die. The machine under discussion has a direct connected motor and is without clutches. The motor in either direct or alternating current is coupled to the main shaft of the machine and is started and stopped by the operator's control bar, which passes along the entire working side of the machine. Each block has the advantage of a slow start, the starting characteristics being exactly those of the motor. Experiments in single-draft work with direct connected motor indicate that, with a smoothly accelerating start, the drawing speed may be pushed up to 1000 ft. per min. without undue injury to die or

wire. The heat is carried away by the wire, so that the temperature of the die does not rise in direct proportion to the drawing speed.

In England, where continuous dry drawing of coarse wire at high speeds is a live issue, the general report is that high speeds cannot be attained because the temperature rises in the wire are cumulative. The drafts come in such rapid succession that, before the finishing die is reached, the wire is hot enough to destroy its own coating. If this is true there are interesting possibilities in the new machine. The holding of wire in storage between dies, together with the long path traversed from block to die, has a marked cooling effect.

The present standard speed of these machines (700 ft. per min.) was adopted because it gives a run-off rate per 300 lb. bundle which fits into a good operating cycle at two machines per man. Under these conditions the output per man is about double the average output in single draft work in the same gage. The natural field for the machine is 3 and 4 draft work from the No. 5 rod to sizes ranging from 11 to 14 gage. Chilled cast iron dies are used in practically all the machines installed in this country. The first installation is now two years old.

It is interesting to speculate as to the effect of this drawing system on the labor problem. The present system puts a premium on strength. The new system offers rewards to dexterity and ability to profit by motion study. It should be possible to draw on a different class of labor for rod drawers. It is not difficult to believe that the use of continuous machines of this type will change entirely the character of the labor problem in wire mills.

Smaller machines of this type are now under observation, including 16-in. blocks to finish sizes from 16 to 18 gage, and 12-in. blocks for the smaller sizes.

NEW VANADIUM SUPPLY

As Uranium Operations Cease, Carnotite-Bearing Deposits Are Found in Colorado

BY KIRBY THOMAS

THE larger part of the uranium supply of the world heretofore has come from western Colorado and Utah from a large area, through which have been interspersed, at wide intervals, small but rich deposits of uranium ore. The uranium ore occurring in the form of carnotite is associated with various vanadium mineral compounds and there has been a production of vanadium from these uranium deposits which has been quite important as a supply of vanadium, independent of the principal source of the world's supply in Peru, which is controlled altogether by the Vanadium Corporation of America.

The discovery in Africa of uranium ores, the chief demand for which is in the production of radium, has practically put out of operation for the time most of the Colorado-Utah properties and thus cut off an independent supply of vanadium.

The only other source of vanadium of consequence is in connection with the roscoelite deposits in southwest Colorado, the largest of which is controlled by the Vanadium Corporation of America and practically all of the remaining deposits of this kind are in the hands of a Colorado corporation, now in process of reorganization.

Curiously, with the curtailment of the American production of vanadium from the uranium operations, a notable discovery of vanadium in an unexpected locality and in a formation which has been long accessible to many engineers has been made.

This new deposit outcrops on the "rim rock" in East Rifle Creek Canyon, in western Colorado. Samples were taken at random at widely different points along the outcrop and these ranged from 2.32 per cent V_2O_5 to 5.3 per cent V_2O_5. The average of the samples gave 3.87 per cent V_2O_5. The deposits lie near Rifle Station on the D. & R. G. road, along the east side of the East Rifle Creek about 100 feet above the creek, along which the wagon road leading to the railroad runs. The ore, which can be easily mined by tunnels and galleries, is therefore convenient to the road for truck or wagon at moderate rates to a point of shipment.

Plans for the immediate and extensive operation of these deposits have been formed. They are owned by the Vanadium Corporation of Colorado, a new organization of which George Kunkle of Grand Junction, Col., is president and H. R. Thurber, of New York, is secretary. The company claims about 3000 tons blocked out and is planning to ship the ore East and to European consumers without further treatment at the property, as the unusually high content will permit this. The deposit is being investigated by engineers and by a Government geologist and important things are expected of it.

The regional geology of this part of Colorado is Mesa Verde. The distribution of the carnotite-bearing rocks comprise a relatively narrow strip of territory that extends for about 30 miles south of Meeker, parallel with the Great Hogback, at which point it turns southeast and continues for 28 miles, as far east as Glenwood Springs. This new deposit in Garfield County is on the western edge of this strip of territory at the point where it turns southeast, and is near the head waters of Rifle Creek. It occurs in a massive incline of 800 ft. of vertically exposed McElmo, La Plata, and Dolores rocks, which dip at an angle of about 15 deg. to the south, and from 1 to 3 deg. to the east. The ore does not occur in the McElmo, but at the boundary of the bedding planes between the La Plata and the Dolores. The lens of ore follows the same variations in dip as the overlying strata, which are structurally the remnant of an anticlinal fold. The deposit varies from 2 to 7 ft. in thickness, and can be traced from north to south a distance of 1500 ft., where it dips under the detritus accumulated in the bottom of the canyon.

Another vanadium development is reported from Emery in Utah. This is in the same geological horizon as the carnotite type deposits and while it may yield immediate production, it is not likely to be extensive, if one may judge from results of numerous exploitations in connection with other deposits of this character.

British Pig Iron and Steel Output in April

LONDON, ENGLAND, May 15 (*By Cable*).—A new record for pig iron output was made in Great Britain in April at 652,200 gross tons. This compares with 633,600 tons in March, the previous high mark for this year. The April production of steel ingots and castings was 749,000 tons, which compares with 802,500 tons in March. On a daily rate basis the April output is a little larger than that in March at practically 30,000 tons per day, as compared with 29,720 tons per day in March. The April record in pig iron compares with an average per month in 1920 of 669,500 tons per month, and the April record in steel with 755,600 tons per month in 1920. The present rate of output, however, largely exceeds the 1921 or 1922 rate in both pig iron and steel.

The comparative data for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month	855,000	639,000
1920, per month	669,500	755,600
1921, per month	217,600	302,100
1922, per month	408,300	486,000
1923, January	567,900	624,300
1923, February	543,400	707,100
1923, March	633,600	802,500
1923, April	652,200	749,000

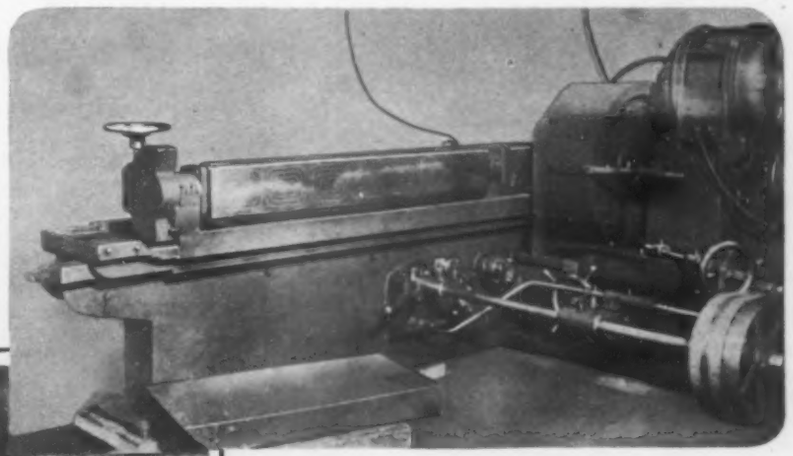
Société Anonyme pour l'Industrie des Metaux, Lausanne, Switzerland, has taken over the aluminum and metal business of Le Minerai Société Anonyme. The latter company will continue to trade in bauxite and chemical products. C. W. Leavitt & Co., 30 Church Street, New York, are sole selling agents in the United States for both corporations.

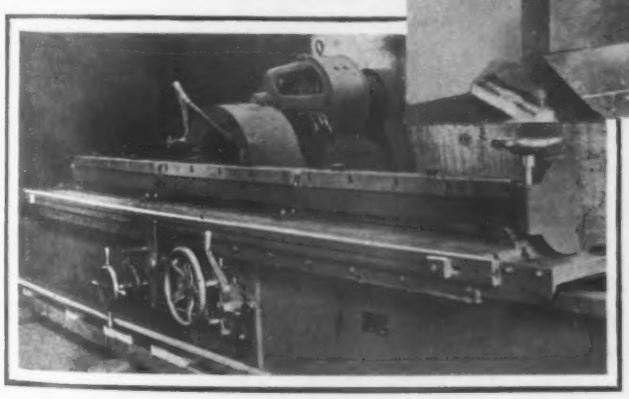
Maximum Production in Flat Bar Grinding

Process Studied for Setting Piece Rates—Formula for Ascertaining Grinding Time—Method of Determining Standard Performance

BY HENRY REKERSDRES*

THIS article will have served its purpose if it saves time study men or others the labor of digging into indexes, books and periodicals for information which will serve as a guide in determining what can be expected as satisfactory performance in grinding steel bars to specified thickness. The writer, with the assistance of librarians, made vain efforts to secure information which would enable him to attain good performance in grinding flat tool steel bars to even thickness on a Bridgeport Safety Emery Wheel Co.'s knife-grinding machine, for the purpose of setting suitable piece prices on the production from this machine tool.





For Setting Piece Rates In Grinding Steel Bars To Specified Thickness On Machines of the Type Illustrated, Detailed Studies Were Made. A rear view of the machine with magnetic chuck in position, is shown at the right. The front view, below, is of a similar machine equipped with a revolving knife bar instead of magnetic chuck

The data given herein is the result, then, of gradually building up the speed feed and depth of cut till there was obtained a performance which we consider the best that can safely be developed under the circumstance, stock coming away warm from under the wheel with cutting compound visibly vaporizing. This performance has been put into the form of a formula for use on similar machines under similar circumstances.

Equipment, Material and Sequence of Operations

The knife-grinding machine used has two long magnetic chucks mounted on the platen, as shown in the accompanying illustration. These chucks are capable of taking each four bars or strips of steel 4 ft. long by 1½ in. wide. The strips are brought close together when mounted on the chucks, giving a width of 6 in., or a total surface to be ground of 2 x 0.5 ft. x 4 ft. or 4 sq. ft. The material worked upon was Ketos tool steel 3/16 x 1½ in. as received from the manufacturers.

The wheel used for this operation was of 12 segments, 26 in. in diameter, 16 grain, 2¾ grade specified for soft tool steel by the Bridgeport Safety Emery Wheel Co. The speed of the wheel was 693 r.p.m., giving a surface speed of 4720 ft. per min. During the grinding operation a stream of cutting compound ¾ in. in diameter kept playing on the surface of contact. A 15 hp. a.c. motor at 860 r.p.m. was used to drive the machine.

In mounting the strips or bars on the chucks it was found of utmost importance that they be flat, without kinks or twists. Failure to observe this precaution results in loss of time in placing the pieces on the chucks, as twists must be removed to make the bars take hold. Also, if the kinks and twists are not taken out, it will take extra time to grind them off and is apt to make the stock undersized at these points. When the first lot of stock is grinding the operator does this straightening during the operating time of the machine. It is worthy of mention that under the heavy load to which this machine was subjected, all oil cups were thoroughly looked after, roller receptacles in the platen ways filled with oil and the tank completely filled with cutting lubricant.

The sequence of operations followed in carrying on the work may be noted from the time study, shown in Table I. With the speed of the grinding increased to a safe maximum, and the platen travel increased to the point where a higher rate of speed involved heavy expenditure for gears, the cross feed, which in this case was the depth of cut, was increased till the ground steel came out from under the wheel smoking. This resulted in the readings as follows: R.p.m. of wheel, 693; speed of platen, 183 in. per min.; cross feed or depth of cut, 0.00101 in. per cycle, back and forth travel of table. The r.p.m. of the wheel was measured directly.

Speeds and Feeds Determined

The speed of the platen was determined by dividing twice the platen travel by the time per cycle, which latter was the average over an entire run, e.g., (108 x 2) ÷ 118 = 183 in. per min. The cross feed or depth of cut was determined by accurately measuring the thickness of a test piece of steel at the beginning of a run, and measuring the same piece again at the end of the run. The stock removed divided by the number of cycles required to grind away this material gave the feed per cycle. This the writer considers more accurate than taking the information from a dial indicator on a grinding machine, especially in this case, inasmuch as the wheel grinds away very rapidly under the

*Department of industrial economy, Eastman Kodak Co., Rochester, N. Y.

heavy load it is carrying. The feed, as here determined, is the actual feed including wear of the wheel.

Derivation of Formula for Grinding Time

From the foregoing data the formula was derived for determining the length of time required to grind off a certain amount of bar stock using either or both magnetic chucks, and including variations in platen speeds due to variation in line voltage of the motor driving the machine.

The derivation of the formula is as follows: With time per cycle of 1.18 min. and platen travel of 108 in., we get (108 x 2) ÷ 118 or 183 in. per min. as the platen speed, or rate of travel of table. Then, if L represents the travel of the platen in one direction (inches) $2\ L \div 183$ = time per cycle in minutes or $0.011\ L$. With a depth of cut of 0.001 in. per cycle, and d representing the amount of stock removed (in inches), we have $d \div 0.001$ = number of cycles required to remove d inches of stock. Hence, $T = (0.011\ L \times d) \div 0.001 = 11\ dL$, time in minutes required to remove d inches thickness of stock, with a platen travel, between stops, of L inches, and a platen speed of 183 in. per min.

Table I—Regular Elements per Grind

	Min.
Mount 8 4-ft. strips on magnetic chuck	2.00
Start motor and set wheel to cut, set stops on table	2.50
Grind 1st side (according to formula)	...
Stop motor, remove guard	.45
Remove 8 strips from chuck	.90
Clean chucks	.65
Clean 8 strips and replace on chucks	4.00
Start motor and bring table up to wheel	.55
Grind 2nd side (according to formula)	...
Stop motor, remove guard	.45
Mike test piece	.45
Remove 8 bars from chuck	.90
Wipe bars clean and dry	.95
Remove sludge, clean chucks	.85
Remove strips to platform	.20
Total time per eight 4-ft. bars, grinding time not included	14.85

In addition to total time above 18 per cent is allowed. This is made up of 29 min. consumed each day for cleaning of the pump and 15 min. for cleaning and oiling the machine. The total time lost for these is 44 min., which is 8.36 per cent of a day of 525 min., approximately ten per cent more is allowed for contingencies, etc., making a total allowance time of 18 per cent.

To make the above formula more general by taking into consideration variations in the platen speed, due to changes in line voltage of the driving motor, and also to make the formula applicable to similar machines with different table speeds, the factor $183 \div S$ is introduced, in which S is the rate of speed at which any given table travels. This factor adjusts the formula to any platen speed, inasmuch as the time per cut, T, varies inversely as this speed. Thus, we get $T = (183 \div S) \times 11 \times d \times L = (2013 \times d \times L) \div S$ as the resultant formula.

To recapitulate: $T = (2013 \times d \times L) \div S$, in which T = time in minutes which cut will take; d = amount of stock to be removed, in inches, reduction in thickness. (In grinding down the first side of stock add 0.005 in. to d to allow for removing the "high spots." This must be done before the wheel grinds on the entire surface of the stock.) L = platen travel in inches, in one direction, distance between stops on table. This should equal continuous length of strips, plus 18 per cent when both chucks are used, and plus 8 per cent when one chuck only is used. S = rate of speed at which platen travels, in in. per min. The depth of cut taken = 0.001 in. per cycle, stock removed per cycle. The time T in the above formula is for four bars of stock 4 ft. long mounted upon each magnetic chuck, or for $4 \times 0.82\ L$ ft. of stock when both chucks are used, and for $4 \times 0.92\ L$ ft. of stock when one chuck is used. When less than four bars are mounted on a chuck the time required will be the same.

The grinding time formula given above has been applied with gratifying results. It has become possible to predetermine to practical exactness the length of time a job done to give specifications should take on the grinding machine, or knowing the time the cut was started, we can tell beforehand when we can expect the work to come off the machine. The time, as computed by the formula, checked within a few per cent of the actual time consumed in the operation. Even this variation is explained by the unevenness of the stock as placed upon the chucks. The same allowances were made in each case for removing the "high spots" and in all cases the time required to grind down these kinks did not correspond with the allowance. Hence, the advisability of having all stock as free from kinks and twists as possible.

Determining Standard Performance Time

When the bars or strips of stock are of uniform length, and an average platen speed can be determined, the grinding time can be easily ascertained from the formula. Further, since we have from observation the regular elements belonging to the operation, along with the time required for cleaning of pump and machine daily, plus allowance for contingencies, personal, etc., as shown in Table I, the standard time per bar or strip can be arrived at with little difficulty.

The method of determining the standard time is shown in the following example, which is for punch or pilot stock, ground from 0.188 to 0.100 in.

In this case S in the formula equals 179 in. per min., $L = 109$ in., $d = 0.088 + 0.005$ in., or 0.093 in. Then T, or the grinding time, will be $(2013 \times d \times L) \div S = (2013 \times 0.093 \times 109) \div 179 = 114$ min. Using this and the data in Table I we have

	Min.
Regular elements per grind	14.85
Grinding time, 0.088 in. stock removed	114.00
Total	128.85
Add all allowances, 18 per cent	23.25
Standard time for 8 bars	152.10
Standard time for 1 bar	19.01

The standard time in which the job should regularly be done is thus found to be 19.01 min. per 4-ft. bar. By the same method the standard time for spacer stock, which is ground from 0.188 to 0.130 in., is found to be 13.61 min. per bar and die stock, ground from 0.250 to 0.143 in. to be 22.50 min. per 4-ft. bar.

From the foregoing standard performance times piece work or premium rates can be easily set.

The Tennessee Company's New Bar Mill at Fairfield Works

BIRMINGHAM, ALA., May 14.—George G. Crawford, president of the Tennessee Coal, Iron & Railroad Co., reports the new merchant bar mill is operating smoothly. The mill was built as per specifications in the announcement of Mr. Crawford a year ago, which said:

"A new merchant mill will be constructed at the Fairfield works, so located as to receive billets from the Fairfield blooming mill, to which tables will be added so that long billets can be delivered to the merchant mill without the necessity of switching cars. The new merchant mill will consist of a roughing train of six stands of 16-in. rolls, an intermediate mill of five stands of 12-in. rolls and a finishing train of two stands of finishing rolls, provided with 11-in. pinions, making it possible to use either 10-in. or 12-in. rolls.

"A mechanical hotbed 255 ft. in length will receive the hot bars from the roll trains and, after cooling, the bars will be sheared and stocked in a stores and shipping room especially adapted for storing concrete reinforcing bars, and with storage capacity for a limited tonnage of merchant bars. The mill and stocking building is 80 ft. wide and 820 ft. long and will be erected by the Tennessee Coal, Iron & Railroad Co.

"The capacity of the mill is estimated at 10,000 tons of plain or deformed bars, rounds and squares, per month. It is to be built to care for the increased demands for bars in the Southern territory and for export."

J. Culver Hartzell was elected president of the Cincinnati Chapter of the American Society for Steel Treating at the regular May meeting held May 10. J. Hunter Nead was elected vice-president, and Fred L. Martin secretary-treasurer. The executive committee will be comprised of E. W. Detraz, Edward Gardner, W. R. Klinkicht, C. J. Wersel and C. H. Waldo. Arthur Townsend, chief chemist Cleveland Twist Drill Co., gave a talk on the manufacture of twist drills.

Philippines as a Market for Iron and Steel

Largest Factor in Imports of the Islands—Principal Movement Is from United States—Possibilities as to Increase

BY VICENTE VILLAMIN

THE author of this article is a Filipino, living in New York, who is deeply impressed by the importance of developing trade with the Philippines. He is enthusiastic in regard to the possibilities of such trade development, and is doing a patriotic service in presenting the facts to the people of the United States. He has written a number of articles on the developments of business with the Philippines along lines other than iron and steel.

IRON and steel manufactures represent the largest item of the imports of the Philippines. In 1900 it amounted to only 6 per cent of the total imports of all commodities, growing to 11 per cent in 1911 and to 19 per cent in 1921, when it was valued at over $22,000,000.

Imports from the United States are protected from foreign competition by a tariff duty ranging from 10 per cent to 35 per cent. During the first years of American occupation, only approximately 10 per cent of the total iron and steel imports came from the United States, but this share, which in 1901 was already 21 per cent, increased to 35 per cent in 1906, 70 per cent in 1913, 92 per cent in 1918 and 87 per cent in 1921, when it was valued at nearly $20,000,000. The 1922 figures represent a recession in line with the statistical position of the general imports and exports.

The larger portions of the 1921 imports consisted of machinery valued at about $8,200,000, iron bars valued at $1,600,000 and firearms numbering 16,732 pieces, valued at $550,000. Japan furnished nearly $100,000 worth of iron bars, this in spite of the tariff barrier. The United Kingdom comes after the United States in the total amount of imports of iron and steel. Hawaii sent approximately $700,000 worth of sugar machinery.

Machinery at Manila

Manila absorbs more American machinery than any other port in the Orient, with the exception of Kobe and Yokohama, both in Japan. But while the imports of the two latter ports are decreasing, the former is only on the threshold of great development. During the last decade the Philippines have occupied the eighth place in importance among the 34 countries to which America exported industrial machinery of all kinds. Considering that the purchasing capacity of the Philippines is only about one-fifth of what it can easily be if there is adequate capital for production, the potentiality of that country as a market can be comprehended.

America needs a distributing center to compete successfully in the Far Eastern market, and Manila is the logical place. This subject deserves serious consideration from American industrial leaders. America is annually losing a big share of the business of the Orient on account of the lack of a commercial base. The British have Hongkong and Singapore, the Japanese have Kobe, the Dutch have Batavia and Soerabaya and the Germans are developing Macassar. These ports have tremendous re-export business in Asia, Oceania and Australasia.

Exports of Machinery

The 4000 factories in the United States which in 1919 had an output of industrial machinery valued at more than $2,200,000,000 exported about 17 per cent, or about $380,000,000, of their total production. During that year 22.9 per cent of their exported output was sent to Asia, excluding Asia Minor and Australasia. In 1920 the percentage of export to Asia was 18.5 and in 1921 it was 26.1. During the fiscal years 1910, 1913 and 1915, the percentages were 7.4, 6.8 and 5.8 respectively. These low levels are explained by the fact that exports of American machinery to all countries were light, being approximately only $51,000,000 in 1910, $96,000,000 in 1913 and $77,000,000 in 1915. To bring home the importance of the Asiatic maret it may be stated that its demand since 1918 approaches the grand total of exports to South America, West Indies and Mexico and Central America.

The strategic position of Manila in the plan of invading the Asiatic markets cannot be improved upon. A free port at that point where supplies can be gathered and warehoused and from which distributions among the neighboring countries can be made on a competitive basis in point of time of delivery, cost and efficiency will go a long way toward the establishment of an American commercial base in the Orient. There are in Manila aggressive and progressive American firms whose activities and outlook transcend the territorial bounds of the Philippines. All that is needed is more faith in the future of the Philippines and more comprehension of the tremendous possibilities of the Far East.

Large Opportunities

The Philippines themselves present a field of big opportunities. Their foreign trade is increasing by leaps and bounds, starting with $48,000,000 in 1900 and reaching $300,000,000 in 1920. The future lies in the development of the rubber industry, the increasing of the sugar production, the stabilizing of the hemp and cocoanut oil industries, the increasing of the output of the cigar and cigaret factories, the lumber mills and the other extant and latent industries of the country. In less than a decade the Philippines will have a foreign trade that will be around $1,000,000,000, and they will be the biggest outlet for American machinery and other iron and steel products.

The following table will show the leading items imported and the rate of their increase. The values are given in round figures:

Items	1913	1920
Bars	$380,000	$1,500,000
Sheets and plates	1,000,000	1,400,000
Nails, spikes and tacks	140,000	380,000
Pipes and fittings	350,000	800,000
Electrical machinery	84,000	380,000
Oil extracting machinery	8,400	440,000
Sewing machines	350,000	600,000
Steam and power engines	800,000	4,000,000
Sugar machinery	1,000,000	2,500,000
Typewriting machines	112,000	200,000
Mining machinery	208,000	37,000
Pumps and pumping machinery	50,000	200,000
Printing presses	19,000	160,000
Adding and computing machines	13,000	71,000
Rails, switches, fish plates	600,000	1,600,000
Castings	4,000	225,000
Chains	60,000	83,000
Locks, butts, hinges, hooks, etc.	41,000	168,000
Nuts, bolts, washers, rivets	79,000	220,000
Safes	37,000	52,000
Scales and balances	25,000	70,000
Stoves and ranges	34,000	43,000
Structural iron and steel	260,000	800,000
Wire and manufactures	250,000	650,000
Tools	243,000	800,000
Enameled utensils	142,000	285,000
Cutlery	104,000	210,000
Tin plate and manufactures	37,000	210,000

There was no rubber machinery imported of any consequence. In this line American manufacturers have a great opportunity. The island of Mindanao will be opened up for rubber growing. Rubber is coagulated, squeezed and washed at the factories on or near the plantations. In the Malay States, where the bulk of the rubber is now produced, the factories are equipped with oil engines of from 20 to 100 hp. of the semi-Diesel type, furnished by the European houses of Hornsby, Ruston-Proctor and Bronz. The mangles used are usually driven by power and are equipped with different designs of rolls. This machinery is generally of the Shaw, Robinson, Bridge or Nering Bogel make. No American machinery is used.

Development Just Started

The development of the industries of the country is just started. More railroad mileage is being laid, automotive vehicles are increasing in number and are being used to develop remote regions, artesian wells are drilled, steel spans and bridges built, reinforced concrete and steel buildings constructed, public works of permanent type undertaken, the use of machinery in industries multiplied and the general industrialization and improvement of production and handling processes are going on. The Government is contemplating improving the harbor of Manila at an estimated expense of some $20,000,000. Every industrial concern is planning extension work. Such is the diversification of the products of the Philippines that new and profitable industries need only capital and enterprise to get started.

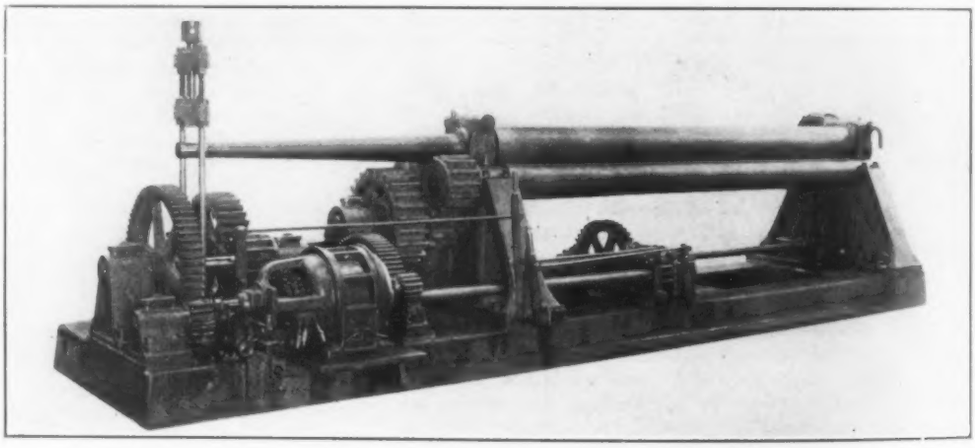
But with all the tremendous possibilities that that country offers to the American manufacturer, it is safe to state that less attention is paid to it by them than to Central America, although the combined trade of its six constituent countries with the United States is only about one-half of the trade of this country with the Philippines.

The vital importance of the Philippines as distributing center for the big and growing markets of the Far East alone entitles that country to the serious consideration of every American manufacturer, exporter and banker.

New Pyramid Type Bending Roll

A No. 2 pyramid type bending roll, spaced 10 ft. 2 in. between housings, a feature of which is that none of the gears protrudes into the foundation, thus eliminating the need of a pit, has been placed on the market by the Cleveland Punch & Shear Works Co., Cleveland.

The machine is direct-connected motor driven and is entirely self contained, as shown. It is arranged for power raising and lowering to the top roll. One of the lower rolls, which are 8 in. in diameter, has three splines, the other has two splines and a flanging groove. The upper roll is 11 in. in diameter. Two clutches are provided to permit either end of the top roll to be raised or lowered, an additional single clutch being employed for starting the roll. The top roll is equipped with an outer drop hinge which can be dropped by lifting the cover plate from the shoulder bolts and dropping the yoke. This is said to be a one-man job.



New Pyramid Type Bending Roll. The machine is entirely self-contained; no gears protrude into foundation and a pit is not required. Power raising and lowered to the top roll is provided. One of the lower rolls has three splines and the other has two splines and a flanging groove. The upper roll is 11 in. in diameter

Oxygen in Metallurgical Operations

The investigation of the feasibility of the use of oxygen enriched air in metallurgical operations is being continued by F. W. Davis, metallurgist of the Department of the Interior, Bureau of Mines. Two phases of the problem are being studied: the manufacture of cheap oxygen, and its application to metallurgical fields. Mr. Davis is devoting his time largely to the last phase of the problem.

The chair of biochemistry of the College of Medicine, University of Cincinnati, has been named the Andrew Carnegie Chair of Biochemistry, in honor of Andrew Carnegie, who took an active interest in the University of Cincinnati during his life.

Connellsville Region Operations

UNIONTOWN, PA., May 14.—With 100 per cent car placement to coke operations in the Connellsville region, operators are moving somewhat cautiously in the curtailment of their output. There is every indication that the demand for coke is being stabilized and that an improvement will be noted during the next few weeks. Coke producers for the past several weeks have been cutting their output to meet the demands, but this curtailment has largely been through four and five-day operations at the plants rather than through the putting out of ovens. Some few ovens in the region were put out, however, but this is not a general condition.

American Manganese Mfg. Co., Dunbar, this week resumed work at its furnace which has been idle for some time.

Announcement was made today of the purchase by the Puritan Coke Co. of the James H. Hoover estate coke plant, adjoining the Puritan property. A cash consideration of $800,000 is involved. There are 200 acres of undeveloped coal and 194 ovens on the Hoover estate. This plant has been in operation and operation will be continued by the new owners who took charge today. The Puritan Coke Co. is controlled by G. S. Harah, James R. Cray and W. W. Parshall.

Coal production in the region, including shipments by river, will aggregate around 550,000 tons for the week.

The fourth annual conference of the National Association of Office Managers will be held in Detroit, June 14, 15 and 16. Particulars may be obtained by writing the secretary of the association, G. S. Childs, Alexander Hamilton Institute, 13 Astor Place, New York.

CLEANING METALLIC ABRASIVES

Pneumatic Separator Removes Sand and Other Impurities and Increases Effectiveness

Separation of metallic abrasives from molding sand, core sand and other impurities by air suction, and their return for re-use in the sand blast machine, is a new development in the foundry equipment field. The use of metallic abrasives, such as chilled iron shot and crushed grit for sand blast purposes, is becoming more general, this being probably due more to the lasting qualities of these abrasive materials than to any other reason. It is stated that with proper precaution to prevent scattering, metallic abrasives will retain their abrasive qualities almost indefinitely, provided all foreign matter with which they are mixed during the sand blast operation is separated and removed. An additional advantage of the metallic abrasives over sand, especially in sand blast rooms and cabinets, is the elimination of the dust created by the disintegration of the sand.

Sand blast equipment is used extensively for the cleaning of castings, and in the operation the molding and core sand removed from the castings becomes mixed with the spent abrasives. If this mixture were returned to the sand blast machine, the effectiveness of the abrasives would be impaired and the ejection of the sand and dust through the sand blast nozzle would create a dust condition which the use of metallic abrasives is expected to eliminate. It is, therefore, necessary to effect a thorough separation of the abrasive from all impurities, which is extremely difficult to accomplish by mechanical screening, as such a method would screen only by size.

The W. W. Sly Mfg. Co., Cleveland, has designed and secured patents on a pneumatic separator for separating the metallic abrasives from other materials. This is made a part of the ventilating system of the company's sand blast equipment. The expansion of the air current and an ingenious arrangement of two baffles in this separator permit the metallic abrasive to drop and be discharged, while sand, dust and other lighter materials, regardless of size, are carried along by the air current.

A restricted abrasive discharge opening on the separator permits the entry of a small volume of air, which gives the abrasive a final washing effect. The air required for ventilation therefore is put to two additional tasks, lifting the abrasive for return to the sand blast machine and thoroughly cleaning and separating the abrasive from the refuse. This pneumatic system of elevation and separation is quite simple. There are no mechanically moving parts and no bearings, gears, pulleys, belts and screens to require attention for lubrication, maintenance and repairs.

Decrease in Corporation's Unfilled Orders

The United States Steel Corporation on April 30 had 7,288,509 tons of unfilled business on its books, or 114,823 tons less than reported for March 31. The decrease is the first one reported this year. At the close of March the unfilled tonnage showed an increase of 119,343 tons, of February one of 373,213 tons, and of January one of 165,073 tons. A year ago the unfilled tonnage stood at 5,096,913 tons or 2,191,596 tons less than on April 30. The tonnage standing on the books at the close of April, last year, represented an increase of 602,765 tons over the March 31 showing. The unfilled tonnage reported by months since January, 1920, follows:

	1923	1922	1921	1920
Jan. 31	6,910,776	4,241,678	7,573,164	9,285,441
Feb. 28	7,283,989	4,141,069	6,933,867	9,502,081
March 31	7,405,332	4,494,148	6,284,765	9,892,075
April 30	7,288,509	5,096,913	5,845,224	10,359,747
May 31	.....	5,254,228	5,482,487	10,940,465
June 30	.....	5,635,531	5,117,868	10,978,817
July 31	.....	5,776,161	4,830,324	11,118,468
Aug. 31	.....	5,950,105	4,531,926	10,805,038
Sept. 30	.....	6,691,607	4,560,670	10,374,804
Oct. 31	.....	6,902,287	4,286,829	9,836,852
Nov. 30	.....	6,840,242	4,250,542	9,021,481
Dec. 31	.....	6,745,703	4,268,414	8,148,122

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747.

Lake Iron Ore Shipments in April

Shipments of iron ore from Lake Superior ports in April this year, as compared with April, 1922, were as follows in gross tons:

	April, 1922	April, 1923
Escanaba	40,219	14,184
Marquette	.....	.....
Ashland	24,555	.....
Superior	52,387	.....
Duluth	19,000	.....
Two Harbors	.....	.....
Total	136,161	14,184
Decrease		121,977

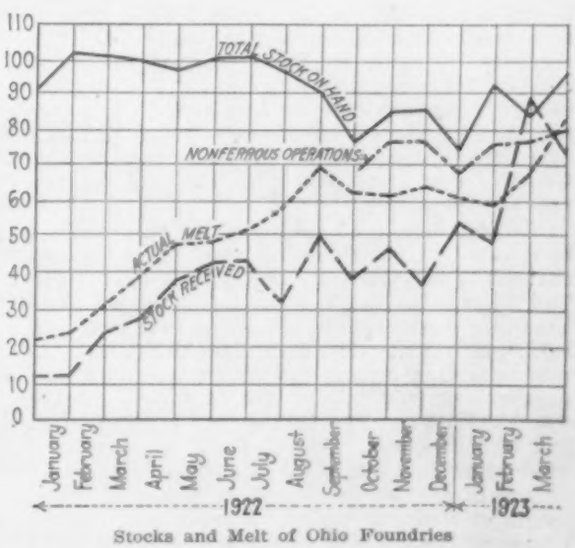
The smallness of the shipments thus far this year is due to the late opening of navigation.

Increased Activity of Ohio Foundries

THE report of March operations by the Ohio State Foundrymen's Association shows the greatest activity since September, 1922. During March the industry operated at 83.2 per cent of normal. This compares with 67.8 per cent of normal during February and 39 per cent of normal during March, 1922.

The association states that the normal melt figure constitutes the total capacity of all of the foundries reporting, that is to say, if all of the foundries had sufficient business to operate at capacity, there could have been produced during March, 25,844 tons of castings. All of the foundries did not operate at capacity, however, and there was produced 22,602 tons of castings, giving an actual melt of 87.46 per cent. Total stocks on hand show a further increase as compared with February, being 26,617 tons. This compared with the normal melt figure of 25,844 tons, equals 99.1 per cent, the highest point this figure has reached for almost a year. In March, 1922, this figure stood at approximately 100 per cent. This was occasioned by operators at that time being obliged to take deliveries on many contracts and the further fact that business had tapered off somewhat, which reduced the opportunity to move materials.

Stocks received are shown as 73 per cent of normal. They are 19,406 tons. For February this figure stood at about 9 per cent; for March, 1922, at 38 per cent.



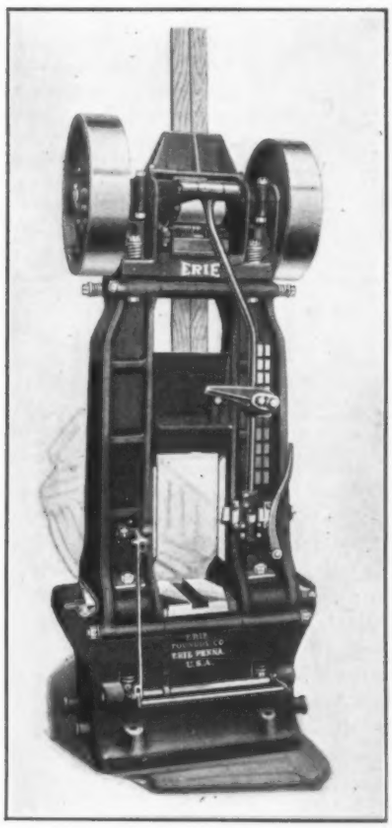
Stocks and Melt of Ohio Foundries

Non-ferrous operations have also shared in the upward movement of the figures. During March the figure increased to 80.2 per cent; during February non-ferrous operations were at 76 per cent of normal.

New Line of Board Drop Hammers

The Erie Foundry Co. has placed on the market a new line of drop hammers, the outstanding features of which include wedge adjustment of the frames across the anvils, the use of tie bolts and separators between the frames at the bottom, and a new type of latch.

The use of wedges for adjusting the frames across the anvil, usually confined to heavy steam hammers, is intended to eliminate difficulties of the usual screw adjustment, and hold the frames and anvil together as a solid unit, making it easy to maintain alinement of the dies, and facilitating adjustment. The use of wedges together with the tongue and groove construction between frames and anvil is intended also to prevent scale from working into this joint, and thus decrease the wear.



Use of Top and Bottom Separators and Tie Bolts, Wedge Adjustment of Frames Across the Anvil, and New Type of Latch are Features

The use of tie bolts and separators between the frames, top and bottom, front and rear, is emphasized as another factor tending to maintain the alinement of the whole machine. The separators prevent binding of the ram in the guides and at the same time serve to minimize the play; their length can be reduced to compensate for wear of the guides or planing down. The area of the tongue and groove joint between the frame and anvil has been increased, and the elimination of screws intended to close the opening through which most of the scale worked which caused wear at this point. The tendency to buckle has been removed entirely, it is claimed, the wedge providing a broad, flat bearing back of the frame, and between the frames the separators are placed at the extreme front and back so that pressure tends to square up the frames against the spacers. On the larger sizes, double V's are used between the ram and the guides.

Several details of the operating mechanism have been improved. The point of knock-off is conveniently changed by an adjusting screw at the side of the frame. The friction bar drops vertically in guides, the latch bar being moved by the descending ram from under a block which fits against a shoulder on the bar. As the ram ascends, a hickory pin strikes one end of the roll release lever, which is pivoted on a block clamped to the friction bar. The friction bar is lifted gradually and without shock. The other end of the roll release lever bears on a pin which is adjustable up and down on a rack cast on the frame, by means of which the length of stroke is varied. A cross-head construction is used at this point to reduce wear and shock.

The sow block is of forged steel, held in the anvil by planing one side to a V, a double 10-deg. angle, also tapering in a vertical plane. No dowels are required and it is claimed that the harder the block is hammered the tighter it is held.

Chrome-nickel steel forgings are used for the various parts of the latch and roll release mechanism. The friction bar also is of chrome-nickel steel, as are the roll shafts, the housing bolts, the roll housing bolts, and a number of the less important connections. The ram is an open-hearth steel casting, cast by a special process to assure a dense structure of clean metal. Main bearings are bushed with phosphor bronze, and ample bearing area is provided.

Anvils are available in the ratio of 15 to 1 or of 20 to 1 to the weight of ram. The frames and anvil are semi-steel in the standard hammers, but they can be furnished from open-hearth steel castings. The ram also is available in either forged or cast steel and the pulleys of wood, paper or steel.

The new line of hammers will be built in sizes from 200 to 4000 lb. weight of falling parts.

Zinc Retort Residues

An investigation of methods for treating zinc retort residues to recover the zinc that is left in the residues has been completed by the Department of the Interior at the Mississippi Valley experiment station of the Bureau of Mines, Rolla, Mo. The residues from smelting zinc ores have from 40 to 75 per cent of the weight of the original ore and contain 5 to 15 per cent zinc, and some unconsumed coke. The annual production of such residue is 450,000 tons, containing about 36,000 tons of zinc, and large piles have been accumulated at some smelters. The survey of the Bureau of Mines has shown that no general method can be worked out, but the possibility of treatment and best method to use must be decided by each plant, according to local conditions. A paper on the treatment of zinc retort residues, prepared by B. M. O'Harra, metallurgist, will shortly be issued by the Bureau of Mines.

Ten-Thousandths Microgage Set

A set of microgages arranged in ten-thousandths of an inch, intended for checking micrometers and for direct use on parts being machined, has been added to the line of the Van Keuren Co., 362 Cambridge Street, Boston. Heretofore the microgages were available in small sets including 16ths, 32nds, 64ths and thousandths

Microgages Arranged In Ten-Thousandths of an Inch. The set is made up of 35 gages. A 6-in gage block is used

of an inch. The set illustrated is made up of 35 gages: the ten-thousandths series of 10 gages from 0.100 to 0.1009; the thousandth series of 10 gages from 0.101 to 0.110; the hundredth series of nine gages from 0.120 to 0.200, and additional gages 0.300, 0.500, 1.000, 2.000, 3.000 and 6.000.

The use of a 6-in. gage block is a departure from standard gage block sets which usually have been limited to 4-in. gages. With the 6-in. gage the range of the set is 14 in. and over 140,000 different combinations are available. The 6-in. gage is also a convenient unit for increasing the range of existing sets of combination gages.

South Great in Steel Making, Not in Using

Abundant Raw Materials and Low Assembling Costs, but Market Is Lacking—Europe Largely Self-Contained

BY DWIGHT E. WOODBRIDGE

IN the course of an article on Birmingham and low cost steel, in THE IRON AGE for April 19, Y. A. Dyer makes this statement:

While these natural resources of the Birmingham district are now being utilized on a substantial scale, it is quite within bounds to say that they are capable of development to the extent of supplying the entire iron and steel making requirements of the United States, on the present scale, for 28 to 30 years, without having to resort to the enormous supply of low grade ores or low yield coking coals available within a 30- to 40-mile radius of Birmingham.

Although this statement may be true enough as to the mineral possibilities of the district, it is the fact that the Birmingham district never has mined up to 6,000,000 tons in any year; its maximum was 5,728,000 tons of hematite ore in 1917. Hematite ore from Red Mountain was used first on a considerable scale during the Civil War, and the first blast furnace in Birmingham was built in 1880. On the other hand, the Lake Superior district attained a maximum shipment of nearly 67,000,000 tons in 1916, and may do almost as much this season. It was 1873 before it ever reached a yearly output of a million tons.

It is not because there is no one in the Birmingham district capable of developing mines or furnaces or steel works to an unlimited extent that the region does not show production more commensurate with its reserves; it is not because capital for indefinite expansion is lacking. There is no question either of the capital, the ability, or the desire. Neither is there a check to production on account of any artificial impediment, such as "Pittsburgh Plus." The district has been treated more generously in this respect than has the West.

Advantages in Raw Materials

Nowhere in America, to say nothing of Europe, are ore and fuel and flux placed in such juxtaposition as at works in the Birmingham district. No works have better opportunity for distribution of products, whether by rail or water. Why, then, has Birmingham not shown an expansion in the steel business far greater than the remarkable growth it actually has had?

The factors that govern the growth of a steel industry are many. Cheap raw material is but one of them. Iron ores are valuable chiefly as they meet the needs of markets, from their mode of occurrence, and by reason of their chemical and physical characteristics. Subordinate to these factors are others of more local importance. None of the latter are absolute, and they vary in relation to each other. An ore low in iron may be valuable because of cheap transportation, easy mining, adaptability to beneficiation, or worth in metallurgical processes, while some far richer ore may wait indefinitely because of less favorable situation or characteristics.

The ores of the Birmingham district are looked on as low grade. Judged from the blast furnace point of view, they are not. In fact, they do not suffer much in comparison with the average iron assay of many standard ores mined in quantity throughout the world. They are mined to the limit of the demand for the iron and steel made from them. This will continue to be the case.

Lack of Steel-Consuming Population

Why is this demand not greater? A controlling factor here is that of allied industries. A study of population and its classification and of freight rates on steel and iron products from the great centers of Pittsburgh, Chicago and Birmingham is illuminating. The country divides itself according to lines of nearly neutral freights into three areas that contain rather similar proportions of the total population of the United States. That of Birmingham includes a vast area of agricultural lands, devoted largely to one crop and that one relying on cheap and unskilled labor, whose wants are comparatively few and whose purchasing power is slight. Lands devoted to cotton and negro labor will never build up another Pittsburgh, no matter how widespread they are. The area tributary to Birmingham lacks that demand for diversity of products of manufacture that has made Chicago and Pittsburgh such centers of industry. Therefore the ore reserves of Birmingham are drawn upon but slowly.

Europe's Good Use of Her Resources

The question of exports is another matter. Perhaps we underestimate the ability of the European steel maker, his hold on markets, his banking connections, and his experience. In Great Britain the Jurassic ironstones contribute the greater part of all iron ores mined, and their average iron content is under 28 per cent. Many of these are distinctly silicious. West coast hematites, which average about 50 per cent iron, contribute only about 1,500,000 tons to the total production of the island, the remainder being chiefly these ironstones. The nation that can make iron out of 27.6 per cent ore and keep on doing it from year to year, successfully, is not lightly to be dislodged from its entrenchments.

When an iron maker is willing to remove 50 ft. of cover to open a bed of ore 24 ft. thick assaying 22.65 per cent iron, even though it may contain considerable lime and water, one must bow to his skill. This was done by the Frodingham Iron & Steel Co. in Lincolnshire, and the case is not especially unusual.

The ores of Briey and adjacent regions, assaying about 33 per cent iron (6 per cent silica and 16 per cent lime), do not present, to be sure, the problems that the British ironmaster has solved, but in a way they do show quite a triumphant metallurgy.

The Distance Factor

In Great Britain, the smallness of the country and its surrounding seas tell in its favor as a center of steel making. Rail and water hauls are short, and coal, iron and flux are easily brought together; while the manufactured article need be carried few miles to some convenient port or consuming point. Somewhat similar conditions exist in France, Belgium, Germany and Sweden. Even when it is necessary to bring raw materials from one European country to another, as the iron ores of Spain and Sweden to England and Germany, the cost of carriage is usually low, because of the short distances and the facilities for the cheapest transportation.

The United States occupies the happy position of possessing within its boundaries abundant supplies of high grade ores and coking coals, and the Birmingham district is fortunate in their proximity; but the world is wide and trade follows its own channels.

Among the additional specifications which have been submitted to the American Engineering Standards Committee for comment and criticism, prior to their formal adoption by the Federal Specifications Board, the organization which drafts specifications for all government purchases, are the following: Steel castings, foundry pig iron, high test gray iron (semi-steel) castings, ingot copper, ingot tin, slab zinc and phosphor copper.

INDUSTRIAL MOBILIZATION

Plans Considered in Meeting of District Chiefs of Ordnance

WASHINGTON, May 15—Comprehensive plans for industrial mobilization which would involve all lines of manufacture and particularly such essential industries as iron and steel and agriculture, and transportation, have been developed to a point of specific detail by the War Department. This became evident in a talk made here on Monday of last week by Assistant Secretary of War Davis before a conference of district chiefs of ordnance. The country has been divided into sections, each in charge of an ordnance chief who will survey production possibilities and prepare plans for immediate use of the entire capacity of his particular district in the event of war. The purpose of the meeting was to further the plans, it being kept in mind, as pointed out by Assistant Secretary Davis, that early production of munitions reduces the post-war financial burden.

In this connection, he said, "An examination of the cost of the last war and the sum which, in consequence, we are now burdened with seems to indicate that this post-war burden will be reduced at a rate in excess of $1,000,000 for each hour clipped from the date of the ending of the war. Early munitions production in insuring an early termination of any war obviates the necessity for large sacrifice of men and allows us to expend shells instead of lives on our battlefields.

"Proper planning in advance will reduce the opportunity for profiteering. If we are able to place our orders for munitions at the very outset of war, we can place them with qualified industry at current prices."

Mr. Davis pointed out that the contracts which are being prepared will eliminate the cost-plus system which was used during the late war in connection with money contracts.

Brig. Gen. C. C. Williams, Chief of Ordnance, stated that plans for industrial mobilization set in motion one year ago have been of great value to the War Department in planning adequate defense of the nation.

As has been pointed out by Gen. John J. Pershing, according to the plans of the War Department, the industrial and manufacturing institutions, agriculture and transportation, would be under governmental control, while the personnel pertaining to all of them would be mustered into the service as are those who are called to the colors.

An efficiency council or board of control would be placed in charge of all resources with authority to make such disposition of them as would best promote the success of the nation in war.

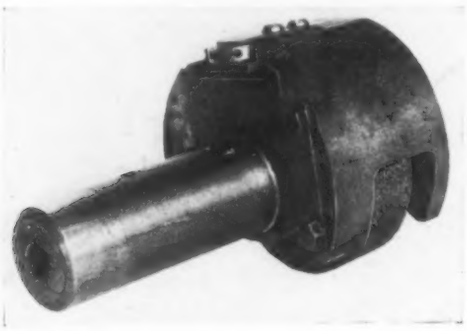
General Pershing has said that looking back upon the world war the requirements for a future contingency can now be pretty well foreseen. He said they include the establishment of plans for manufacturing all sorts of munitions and the procurement of the necessary materials. It is necessary to have motor trucks by the thousands, he said, an abundance of clothing, blankets and food, building material, railroad equipment and implements, telephone and telegraph supplies, and in fact practically every commodity which by the nature of every day business is being manufactured and distributed.

District chiefs who attended the conference included: Howard Bruce, of Baltimore; Col. C. H. Tenney, Boston; Col. B. A. Franklin, Springfield, Mass.; E. A. Russell, Chicago; Col. C. L. Harrison, Cincinnati; Col. Bascom Little, Cleveland; Col. John R. Delafield, New York; John C. Hones, Philadelphia; R. A. Dravo, Pittsburgh; M. E. Singleton, St. Louis, and Col. Bruce Cornwall, San Francisco.

Portable Internal Grinder

A portable adjustable grinder for the removal of excessive metal or high spots from cylindrical surfaces, and which may be used also on flat surfaces, has been placed on the market by the Allen Mfg. & Welding Co., Inc., Buffalo.

The machine, which is known as the Cyl-Grind, may be adjusted or set to the desired radius of the cylinder, and removes only the metal projecting above such radius. This setting may be made while the wheel is in motion and the legs of the main housing are resting on the cylinder wall, by first loosening a locking wedge then lowering the drive shaft bearings, to which shaft the grinding wheel is attached. After the adjustment has been made the locking wedge is tightened, which locks the drive shaft in the main housing. The grinding operation may then be started.



Grinder for Removal of Excessive Metal or High Spots from Cylindrical Surfaces

The illustration shows a front view of the machine. Two sizes are available, one of which, Type A, is preferable for automotive cylinder blocks, and the other, type B, for air, steam and water cylinders of large diameter. Type A is for diameters from 2 13/16 in. and the size of wheel is 2 x 1⅜ in. and type B is for diameters from 4⅞ in. and takes a wheel 4 x 1⅜ in. The machine is available with or without driving motor and flexible shaft.

Reduced Rates on Steel Ordered

WASHINGTON, May 15.—Reduced rates on structural steel, pipe, nuts and rivets, to be made effective not later than Aug. 7, were ordered from Connellsville, Johnstown, and Monessen, Pa., and Portsmouth, Ohio, to Parkersburg, W. Va., in a decision made public last Saturday by the Interstate Commerce Commission. It was based on a complaint of the Parkersburg Rig & Reel Co. The commission found the prevailing rates from Johnstown and Connellsville unreasonable to the extent that they exceed 2c. per 100 lb. over those from Pittsburgh; that the rate from Monessen is unreasonable to the extent that it exceeds the rates from Johnstown and Connellsville and that the rate from Portsmouth is unreasonable to the extent that it exceeds the contemporaneous rate from Pittsburgh.

Record Output of Ford Cars

In the week ended May 8, the Ford Motor Co. established a new high record of output with 39,053 cars and trucks produced. This exceeds by 192 the previous high record, which was 38,861, made the preceding week. A new daily record of 6590 cars and trucks was made on May 4, displacing the record of 6537 established April 17.

Production of Portland cement in April is reported by the Geological Survey at 11,359,000 bbl., compared with 9,880,000 bbl. in March and with 9,243,000 in April, 1922. Only four months in last year's record-breaking production exceeded the output made in April, the largest of all, October, showing 12,287,000 bbl. Production for four months of 1923 has exceeded 37,000,000 bbl., compared with 24,500,000 bbl. in the first four months of 1922.

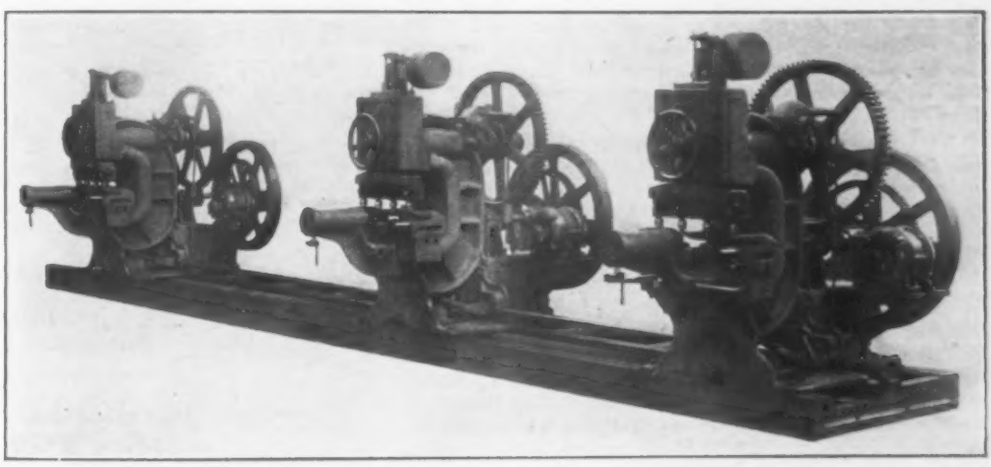
Combination Angle Punching Machine

A combination of three style C machines arranged as shown in the accompanying illustration, for punching angles 26 ft. or less, has been placed on the market by the Cleveland Punch & Shear Works Co., Cleveland. The combination is said to be of particular advantage where there are a number of angles to be punched, as in the construction of oil derricks, radio towers or towers for water or storage tanks, or for punching roof trusses. These angles as a rule have groups of holes at each end and in the center.

Individually adjustable attachments permit of a minimum of 2 in. and a maximum of 20 in. between attachments on each machine. The angles may be punched in either leg without turning end for end. Air cylinders are employed to hold the angles firmly against the gage block in a straightened condition, and supports are provided for the angles. The gage blocks are adjustable to permit the punching of various gages in the angles front to back; an end gage is also provided.

One of the end machines is stationary; the other two units are adjustable by hand. Each machine may be treaded individually or all three may be treaded simultaneously from either end. The air cylinders may be operated individually or all may be operated simultaneously from the stationary end.

The capacity of the style C machines is for angles 6x6x5/16 in. maximum, but the same combination can be provided with machines having greater or less capacity.



Combination Punching Machine for Use Where a Number of Angles Are to be Punched, As In the Construction of Oil or Water Towers. One end machine is stationary and the other two machines are adjustable by hand. Each machine may be treaded individually or all simultaneously from either end

New Tin Smelting Plant in Australia

O. T. Lempriere & Co., who for many years have been exporters of ores and metals from Australia, are now erecting their own tin smelters. For a considerable time past they have been purchasing tin ores on the mainland and have had them smelted on a toll basis at the Mt. Bischoff Co.'s works at Launceston, Tasmania, but they have decided to discontinue this policy for economic reasons. After careful investigation it was found that the most suitable place would be a site near Sydney. The plant being built there is now approaching completion and smelting operations will commence at an early date. F. B. Jackson, manager of the Mt. Bischoff Co.'s smelters for about 20 years, has been appointed by the firm to take charge of their works. The brand of the metal will be "O. T. Lempriere & Co., Australia," and the firm proposes to pay particular attention to the production of a tin especially suitable for tin plating. The London office of the firm is No. 85 Gracechurch Street, E.C., 3.

According to Donald M. McGregor, a director of the Ford Motor Co. of Canada, the border cities of Ford, Windsor and Walkerville will be able to secure domestic coke from the Ford company in the fall of 1924. The plant which the company will build at Ford, Ontario, will utilize the by-products and will have an excess of coke for domestic consumption.

Proposed Rates on Pig Iron

WASHINGTON, May 15.—Developing further its service in establishing joint water and rail rates on pig iron, the Arrow Transportation Co. has filed a tariff with the Interstate Commerce Commission, scheduled to become effective June 7, naming rates on pig iron from Florence and Sheffield, Ala., to points on the Illinois Central; Chicago, Milwaukee & Gary; Chicago, Milwaukee & St. Paul; and Chicago, Rock Island & Pacific Railroads. This is an extension of the policy made effective on Sept 15, 1922, by the Arrow Transportation Co. when it established a rate of $1.96 on pig iron to the Ohio River crossings and the rate to Chicago became $4.18, which was a sharp cut under the all-rail rates from Alabama furnaces. The initial rates were made in connection with the Chicago, Burlington & Quincy Railroad as a concurring carrier. The through rates shown in this tariff were merely a combination of the barge line rate to Ohio River crossings and the rates of the Burlington beyond. Under the new tariff, other railroads have entered into joint rates with the barge line and it is stated that because rail carriers north of the Ohio River receive their full proportions for the part of the hauls they perform, their interests are not injured by the action of the barge line in reducing the pig iron rates.

Fluorspar in 1922

The Department of the Interior, through Hubert W. Davis, of the U. S. Geological Survey, reports that the domestic fluorspar mining industry showed considerable improvement during 1922, recovering from the severe slump of 1921. The improvement was due principally to a larger demand for fluorspar of fluxing grade in the steel industry, which took about 86 per cent of the mineral shipped in 1922.

The producers of about 70 per cent of the basic open-hearth steel made reported that they consumed 72,962 net tons of fluorspar in 1922 and had stocks on hand amounting to 45,637 tons on Jan. 1, 1923. If the steel companies which did not report consumed a like proportion of fluorspar, the figures given indicate a total consumption in all steel plants of about 104,000 tons in 1922 and total stocks of about 65,000 tons on hand Jan. 1, 1923.

Tables published with the report show that shipments by States in 1922 totaled 139,700 tons, of which Illinois was credited with 83,800 tons. The shipments in 1921 were only 34,960 tons for all producing States.

Classified as to uses, the steel industry is credited with having used 120,800 tons of the total 1922 shipments, against only 25,553 tons in 1921.

Imports of fluorspar in 1922 were over five times those in 1921 or 33,108 tons last year, against 6229 tons the year before. England is reported as the largest source of supply last year at 23,836 tons.

The Western Foundry, Holland, Mich., which has been idle for more than two years, will soon resume operation.

AMERICAN ZINC INSTITUTE

Annual Convention Elects Officers and Discusses New Uses of the Metal

ST. LOUIS, May 15.—Frank C. Wallower, general manager of the Golden Rod Mining & Smelting Corporation, Joplin, Mo., was elected president of the American Zinc Institute last Tuesday at the closing session of the two-day convention of the institute held at the Hotel Chase in this city. Mr. Wallower had been the third vice-president of the organization.

A. P. Cobb, vice-president of the New Jersey Zinc Co., New York, was re-elected first vice-president. Cornelius Kelley, president of the Anaconda Copper Mining Co., was re-elected second vice-president. Jesse G. Starr, one of the large mine owners of the tri-state district and president of the Quintin Spelter Co., was elected third vice-president to succeed Mr. Wallower. Howard I. Young, treasurer, and Stephen S. Tuthill, secretary, were re-elected.

It was decided at a meeting of the board of directors on the second day of the convention to spend $100,000 on a publicity and advertising campaign setting forth the merits of zinc in all its branches. "The zinc industries believe that they cannot expect the consuming public to take an interest in their products unless they themselves demonstrate their belief in them," Mr. Tuthill said.

The plan of financing the organization already in use will be followed in the coming year. This plan calls for a payment of 5c. a ton on slab zinc, 2½c. a ton on zinc concentrate containing 50 per cent of zinc and over, and 1.50c. on zinc concentrate containing under 50 per cent of zinc.

New Uses for Zinc

"This session of the institute was attended by representatives from every branch of the industry," Mr. Tuthill said. "Upward of 200 were present. The fact that our financial condition is reported as sound is very encouraging, for it indicates that we have reached a point toward which we have been working for five years. One of the topics of discussion at the convention was new uses for zinc. When we got to talking it over, however, we discovered that several companies had already done something in this line. We decided that it was the duty of the institute to develop the channels that were already mapped out. Another aim will be to prevent the use of zinc when it will react unfavorably to the industry."

In papers read at the various conventions of the institute it has been the policy to take up the successive steps in the development of the uses of zinc. The records of the American Zinc Institute are thus pointed to as a history of the zinc industry in this country.

At a dinner Monday night, May 7, the convention was addressed by Sherman Rogers, industrial editor of the *Outlook*; E. P. Matthewson, president of the American Institute of Mining and Metallurgical Engineers; Dr. Walter R. Ingalls and Dr. H. Foster Bain, director of the Bureau of Mines, Department of the Interior.

New Officers for New York Steel Treaters

At the regular May meeting of the New York Chapter of the American Society for Steel Treating held Wednesday evening, May 16, the following officers for the ensuing year were declared elected by letter ballot: S. Tour, Doehler Die Casting Co., Brooklyn, N. Y., chairman; E. E. Thum, associate editor *Chemical and Metallurgical Engineering*, New York, vice-chairman, and T. N. Holden, Jr., E. W. Bliss Co., Brooklyn, secretary and treasurer. Mr. Holden was re-elected for the third consecutive time.

The principal address of the evening was delivered by Charles M. Knight, Jr., of the International Nickel Co., New York, who took as a subject "Inspection of Steel." It was liberally illustrated with lantern slides.

Planning and Sales Topics at Taylor Society Meeting

Three sessions of the meeting of the Taylor Society, to be held at the Hotel Onondaga, Syracuse, N. Y., June 7 to 9, will be devoted to planning topics.

Inspection of the planning department of the Corona Typewriter Co., with a motor trip to Groton, N. Y., will occupy the entire day, June 8. One of the outstanding papers at the Nov. 23, 1922, meeting of the society was that of Percy S. Brown, works manager of the Corona company, in which the organization and method of manufacturing control of the company were described. This visit to the plant will afford an opportunity to observe the methods and mechanisms of control in detail. Inspection of the planning department of the H. H. Franklin Mfg. Co., which has been described in part by THE IRON AGE, is on the program of June 9. A paper on "The Planning Department as an Instrument of Executive Control" will be given by Keppele Hall, supervisor of planning, Joseph & Feiss Co., Cleveland, at an evening session.

High quality of sales management as a factor in good factory management, which requires continuous operation and employment, will be discussed in a paper on "The Sales Machine, 1923 Model," by Harry R. Wellman, consultant on sales problems, and professor of marketing at the Amos Tuck School, Dartmouth College.

"Business Cycles and Unemployment" will be discussed by Wilford I. King, Bureau of Economic Research, New York, which made a detail study of the subject for the special committee appointed by Secretary Hoover. Mr. King will sum up the results of the investigation, which it is thought should influence every company's administrative policy.

Pittsburgh Base Hearing to Be Held in New York

WASHINGTON, May 15.—Hearing in the Pittsburgh base case will be resumed on Thursday of the present week and will be held in New York at the offices of the Federal Trade Commission. It was intended to begin the hearing earlier, but at the request of counsel of the United States Steel Corporation, it was postponed until the day named. After the hearing is completed in New York, it will be transferred to Detroit and then taken again to Chicago where the Steel Corporation will close its side of the case. The Federal Trade Commission will produce rebuttal evidence and in all probability will conduct this phase of the case which brings the hearing to a final close in Washington. It is likely that the rebuttal evidence will require at least one month. It is not known how much longer the Steel Corporation will require to submit its side of the case.

Fall Meeting of British Institute of Metals

The annual autumn gathering of the Institute of Metals (British) will be held in Manchester, England, Sept. 10 to 13. A ballot for the election of members and students desirous of participating in this and other meetings will take place on July 12, the necessary membership particulars being obtainable from Shaw Scott, secretary, 36 to 38 Victoria Street, S. W. 1.

A general survey of the nickel situation and of the metallurgy of nickel has been made by the Department of the Interior at the Northwest experiment station of the Bureau of Mines, Seattle, Wash., with the object of determining the possibility of treating a recently discovered deposit of nickel ore in Alaska. A new method of treating this ore, a massive sulphide containing pentlandite, chalcopyrite, and pyrrhotite, was suggested, and a few preliminary experiments conducted to determine whether the ore would respond to the treatment. A report of the general study has been prepared and sent to the Washington office.

Sand Problems and Foundry Training

American Foundrymen Discuss New Sand Testing Methods —Extensive Symposium on Training Foundry Workers—Apprentice Problem

TWO sessions on sand problems and one on foundry training were part of the regular program at the twenty-seventh convention and exhibition of the American Foundrymen's Association in Cleveland, April 30 to May 3. Abstracts of the papers and the discussions follow:

Sessions on Sand

The report of the joint committee of the American Foundrymen's Association and the National Research Council on molding sand investigation was read by Major R. A. Bull, at the Wednesday afternoon session, May 2. Major Bull said that the committee's work today was the development of testing methods for molding sand. The committee had tentatively adopted tests for bonding, fineness and permeability, effective for one year, and members of the association were urged to adopt these tests and to make criticisms to the committee, which would be heartily welcomed.

H. B. Hanley read the reports of the sub-committee and gave an exposition of the testing methods adopted, which were illustrated by lantern slides. An exhibition of the sand-testing apparatus necessary was a part of the program, and it was stated that the association would shortly publish full information on how to make this apparatus. In addition to the tests tentatively adopted, Mr. Hanley gave an explanation of the dye absorption test and the chemical analysis method of examining questionable sand deposits.

Cohesive Tests

Dr. H. Ries, Cornell University, read a paper on "The Cohesiveness Test of Foundry Sands," prepared jointly by himself and C. M. Nevin. The paper gave the results of some experiments conducted at Cornell University by the authors. The object of the investigation was to obtain a method of securing comparable data of the cohesive properties of various foundry sands. The method used was that described by R. J. Doty at the 1922 convention, but with a different method of ramming the sand specimen. The method of ramming used was to drop a 20-lb. weight from a height of 16 in., 6 drops being adopted to give sufficient coherence to make the breaks of the bar, when tested, uniform. "The object of the test is to show not only the relative cohesiveness of various sands but to also indicate the water content which would develop the best degree of cohesiveness. By using uniform energy in compacting, measuring the thickness of the bar, recalculating the strength as expressed by weight of broken pieces to 1 in., and expressing the results on a dry sand basis, a real cohesiveness figure is obtained that will definitely show the variation in cohesiveness with different percentages of water and between different sands."

The authors wish to call attention to the fact that a slight variation in the water content may cause appreciable variation in cohesiveness. After numerous tests the authors have found that with ordinary care a very small variation was shown by different bars of the same sand. Care was always taken to see that the sand was thoroughly mixed before testing, as otherwise irregular results ensued. If the first and last breaks of the bar show much variation from the others, they should be rejected, but it was found that in most cases the first break could be averaged in with the others.

Eugene W. Smith, The Crane Co., Chicago, described "A Physical Test for Foundry Sand" in a paper read at this session. The method, known as the vibratory method, has been successfully used by the author in controlling the quality of the sands in daily use at his plant and also for studying new sands with a view of determining their fitness for use in this plant.

Vibratory Tests

The method of making this test was described by Mr. Smith as follows: Use a 10 or 12 oz. clear glass bottle, 1¾ in. in diameter, 6 or 8 in. high. Rub the sand lightly to remove the lumps. Fill the bottle one-quarter full of the material to be tested. Fill the balance with clear cold water and shake thoroughly. Stand the bottle on any foundry vibrator plate, hold down firmly and vibrate until the heavy grains are all down. Then allow it to stand until the water becomes clear. The bond and silica will be found divided by a distinct line. Provide a small rule, the inches divided in tenths. When the solution is fully settled, measure the total, then measure the bond, or upper part, followed by the silica at the bottom. Divide each by the first figure. The result will be the percentage of either. The presence of "yellow" will indicate alumina oxide and "red" the iron oxides. Sometimes both are distinctly shown in the sample, but in most cases their presence is only shown by the varying shades. The fineness may be easily determined by general observation.

In presenting the vibratory test, Mr. Smith said that it does not necessarily represent the latest technical information on the subject. The method, he believes, provides the foundryman, the management and the purchasing agent, the producer, salesman and students with a means of separating the sand and determining the approximate proportion of finely divided material, most of which is undoubtedly silica, and the ferric and alumina oxides by the color; also a visible test of the fineness of the sand sufficiently accurate to determine the class of work for which it is best suited. Its simplicity insures its value as a substitute for the old squeeze and feel method of selecting foundry sands. A suitable rack, in a light place, holding six bottles, one for each day in the week, samples taken each afternoon, thoroughly vibrated, settled at night, measured and marked with small oval labels each morning, show the figures of bond and silica. These figures, governing a curve record shown in combination with the daily losses, will enable the foundryman to maintain a uniform condition of his sand.

Animated Discussion

There was a heated discussion following the reading of Mr. Smith's paper, hinging on the sub-committee's reference to the vibratory test in which it was stated that this test had not been adopted by the committee. Advocates of the vibratory test, of which there were quite a number, particularly from the Middle West, urged that the committee reconsider its decision. The general tenor of the discussion was to the effect that the vibratory test was valuable to the foundryman as a check on his sand, and Mr. Smith was highly complimented by all those taking part in the discussion for the development of this test, as it was felt that anything that could be done to cause the foundryman to study his sand problems was very much worth while. Many foundrymen have adopted the vibratory test and report highly satisfactory results. A degree of caution was advised by some speakers against accepting this test as a cure-all for their sand problems, however, in which Mr. Smith concurred.

Sand Reclamation and Conservation

Reports of the sub-committees on sand research, reclamation, conservation and geological survey work were presented at Wednesday morning's session. Dr.

Ries, for the committee on geological survey, reported that the committee had sent a letter to all State geologists urging that a sand survey be made of each State. The replies received to date were encouraging. The States of Virginia and Maryland began survey work last year, and Alabama, Pennsylvania, New York, Missouri, North Carolina, Mississippi, Wisconsin, Indiana, Tennessee, California, Illinois and North Dakota will begin work this year. The committee also stated that work on Canadian deposits will likely be commenced this year. Samples of sand taken from the different deposits will be sent to the Bureau of Standards and to Cornell University for tests, and the results will be reported to the State geologists and to the A. F. A. The committee urged the foundrymen of the States in which they are located to urge upon the State geologist the importance of this work.

The committee on conservation and reclamation reported that a total of 8777 questionnaires had been sent out to foundrymen to find out how much work had been done on this important work and what results had been obtained. Only 1548 replies had been received, and of these about 10 per cent contained information that could be considered of value. The committee found that Albany molding sands are used by more non-ferrous and malleable foundries than any other sand reported. Windsor Lock is also popular. Several foundries use sands imported from France and Belgium. Ottawa is the most popular steel molding sand, though Portage and Massillon sands are widely used.

Replies to the questionnaire regarding the testing of molding sand indicate that little has been done along this line. About 20 per cent of the foundries indicate that they make tests of one kind or another, but give little or no data regarding their methods nor the value of these tests. Molding sand is as a rule stored under cover. The reasons given for this are that it prevents washing out the bond by rain, keeps the sand cleaner and allows it to dry out sufficiently on the surface so that it will not freeze in winter while yet retaining the moisture in the interior of the pile.

Considerable difference of opinion exists as to the effect of damp aging on the working properties of sand. Some claim that it increases the bond and makes the sand work better while others claim that it shortens the life of sand. Opinions differ as to the value of milling sand. Some prefer to mill only long enough to thoroughly mix while others believe that long milling increases the bond.

Losses Due to Sand

In answer to the question, "When losses in your production are attributed to sand causes, what are the main reasons for rejection?" some very interesting information was obtained from the non-ferrous and malleable iron foundries. About 40 per cent of the trouble was reported as due to incorrect temper. About 25 per cent was attributed to the sand being too tight. Defective bond and burned out sand were also important causes of trouble. Of the plants reporting, 145 dispose of a total of 6618 tons of refuse sand each week. A few of the foundries report the use of some of their refuse sand in cores while several others, of the non-ferrous group, sell it to refiners, but most of the sand is hauled to the dump. The average proportion of new molding sand used with old sand in making up heaps was about 22 per cent for non-ferrous and 15 per cent for malleable foundries. No figures were obtained on steel and gray iron foundries.

Very little work has been done in the way of renovating used molding sand in a scientific way. Several report that they add new sand and then riddle or cut or both. Some add clay, organic binders or salt. Muller and paddle type mixers are in most general use, and a few centrifugal machines are reported. About 20 per cent of the foundries reporting say that they reclaim at least a part of their cores by crushing and adding water, sand, binder, etc. Several have found it practical to reclaim rosin and dextrin bound cores but not oil cores.

A paper on "Reclamation of Core Sand," prepared by F. L. Wolf and A. A. Grubb, the Ohio Brass Co., discussed the practicability of reclaiming sand from defective and used cores. The authors stated that this depended in a large degree upon the kind of binder used in the original core sand mixture. Water soluble and gum binders offer greatest possibilities in the way of reclamation and, after describing tests on linseed oil bound cores and dextrin bound cores, the authors conclude that results obtained are negative as regards the recovery of sand from linseed oil bound cores and more or less positive for dextrin bound cores. Sand from linseed oil cores, even those which have not been burned, is not as good for core sand mixtures as new sand. Not only is no binding value obtained from the oxidized oil, but a larger quantity of oil must be added than is required by new sand. The cost of this additional oil in the tests recorded offset the saving in cost of sand. Cores bound with dextrin gave much better results. By crushing and screening, a large part of the binder as well as the sand was recovered. Cost figures taken on a practical trial indicated that such sand can usually be recovered at a fair profit, depending of course on the cost of the original raw materials.

Reclaiming Brass Molding Sand

A preliminary report on brass molding sand reclamation and conservation experiments was made by Messrs. Wolf and Grubb, the work done having the object of reclaiming the partially burnt or wornout sand regularly discarded from the brass foundry floor, and to find if possible a local sand suitable as a substitute for Albany sands for brass molding. Laboratory tests were made for fineness, bond, permeability, dye absorption and moisture. A number of experiments were also made with the object of restoring bond to the burnt sand, also restoring its absorptive properties. While the authors found that it was impossible to draw definite conclusions at the present time, thus far their experiments seem to indicate that it is possible to add a sand high in bonding material to sand which is partially burned out, and obtain a product that works well on small brass castings.

Doty Cohesive Testing Machine

"Sand Conservation and Reclamation Tests Using the Doty Cohesiveness Testing Machine,'" were described by R. F. Harrington, W. L. MacComb and M. A. Hosmer, the Hunt-Spiller Corporation, in a paper read at this session. Tests were made to determine the effect of moisture on the cohesiveness of new sand, and the conclusion drawn was that beginning at a maximum of 7.96 per cent moisture and decreasing same by evaporation, a corresponding and fairly uniform increase in the cohesiveness is secured until the moisture content has decreased to approximately 6.25 per cent. Varying the moisture content from approximately 6.25 per cent to 5 per cent has but little effect on the cohesiveness of the sand.

Tests were made to determine to what extent the drying out of new sand and remoistening of it increases its cohesiveness as compared with the same sand with original moisture content, and it was found that with a moisture content greater than 6 per cent no appreciable increase in cohesiveness is obtained by drying out and remoistening the sand. With moisture less than 6 per cent an appreciable increase in strength is noted in the sand which is dried out and remoistened. A test was also made to determine the effect of grain size on the cohesiveness of sand. Moisture, bond and weight of sample were constant in each case. The results to date clearly indicate that the effect of grain size in the cohesiveness of molding sands is a vital factor, but the authors feel that a sufficient number of tests have not been made on this problem to warrant the establishment of any rigid relationship between the grain size and the cohesiveness.

The paper also described a test to determine to what extent machine mulling increases the cohesiveness of bushing sand as compared with the same sand mixed by hand, and to determine to what extent, if any, drying out, remoistening and machine mulling increases its strength. It was found that two minutes of machine mulling increases the strength of the bushing

sand 36 per cent. With sand nearly 8 per cent moisture no apparent increase in cohesiveness is obtained by drying out and remoistening. An increase in cohesiveness in the same sand with the same mulling can be obtained by decreasing the moisture.

A test was made to determine if, by machine mulling bushing sand, it is possible to increase the effectiveness of the clay substance present as measured by the dye absorption test and, while a very extensive investigation of this phenomenon has not been made, the work done to date indicated that machine mulling did increase the bonding strength of the clay substance present, in the test conducted the increase amounting to 22 per cent.

H. M. Lane, Detroit, in a paper gave some of the facts concerning the experiments on sand reclamation made by him some years ago. The tests indicated that on an average not less than 60 per cent of the waste product in the form of waste sand going out of the foundry can be reclaimed and re-used, and that ultimately this will be done at a decided profit.

H. W. Highrighter, New Haven, Conn., discussed the use of chemical reagents in preparing and rebonding molding sands.

Symposium on Foundry Training

Tuesday morning's session, May 1, was devoted to a discussion of "Industrial Education—a Symposium on Training Foundry Workers." Quite a number of papers were presented dealing with the methods employed in the plants of the authors, and a general discussion followed on how to secure apprentices for the foundry trade.

C. M. Morrin, apprentice supervisor, Brown & Sharpe Mfg. Co., Providence, R. I., described the system in use in this plant. Discussing the necessity for apprentice training Mr. Morrin said that a serious mistake is made when apprentice training is discontinued or allowed to be sidetracked. The employer is not alone to blame for the conditions responsible for lack of apprentice training, for labor organizations are fostering the spirit that the number of trained journeymen should be restricted. The school systems should also share some responsibility for the lack of training workers. Boys have received the impression that theory was all that was necessary to make a success and manual labor was, to a certain extent, frowned upon. Steps are being taken to remedy this condition through trade schools and cooperative courses, but Mr. Morrin believed that while manual training in the schools is a benefit, it does not, and cannot, supplant real apprentice training in the shops.

The author believed that in order to attract apprentices one of the first things to be done was to make the foundries as attractive as possible in physical conditions. We should work in close cooperation with our schools, and place before the educators and pupils the possibilities for training and advancement in our plants. We should institute a campaign for safety and for the moral upbuilding of all of our employees, for the better our factory and foundry conditions are, the better grade of workers we can secure. Granted that the conditions in the foundry are good what does the apprenticeship mean? The employer should see to it that the purpose of training is to make a skilled worker, and Mr. Morrin emphasized the word "skilled," for we should train the boy to be skilled with his hands primarily, and not attempt to train for leadership if it must be done at the expense of workmanship. It was his belief that skill will develop only by actually doing the various operations, and that repetition makes for skill.

Course at Brown & Sharpe Mfg. Co.

The author described the training course of apprentices at the Brown & Sharpe Mfg. Co. plant, where it has been the policy to take apprentices for 70 years. The courses include machinists, molders, coremakers, blacksmiths, pattern makers and draftsmen. They have an apprentice department, where the boys are controlled under one head. A schedule is laid out for each boy and the apprentice department is responsible for his movements from one department or job to another so as to maintain that schedule. This gives a more uniform training, and relieves the production foreman of the responsibility for the boy's training in other departments than his own. The boys are trained under the production departments and under actual production requirements, and this plan has been found to work better than the segregation plan. In addition to the instructions received from the foreman on the various jobs, a shop instructor visits the boys regularly, giving them advice and instruction about their work. With the regular shop work is combined the school courses in which are taught elementary arithmetic and applied mechanics.

Element of Personal Interest

In order that the management may keep a personal interest in the boys, and to have the boys feel that an interest is taken in them, they are interviewed regularly by the apprentice supervisor, the head of the employment department, the works' superintendent, the sales manager and the industrial superintendent. A trial period of three months before the boy is definitely taken on works to good advantage. A formal agreement is entered into, which requires a sum of money to be paid for learning the trades, the reason being that by this method more serious attention is given by both the boy and his parents, it also has a tendency to eliminate the half-hearted applicant. The company tries to secure boys between 17 and 20 years, of rugged build and without physical handicaps. They must have a grammar school education or its equivalent, and before beginning work must pass a physical examination at the dispensary.

The wage rates increase at the beginning of each period. The first year is spent in the heavy foundry, the first four months acting as helper, and as the boy develops, he is given work to be carried on on his own initiative. The first three months of the second year are given over to core making, and the remaining nine months he returns to the foundry, where he is given work of a more general character to be carried on by himself. In the third year, three months are spent in the light foundry, two months on molding machines, five months on heavy foundry work, one month at the cupola and one month in heavy foundry work with the thought of bringing him along into work that would be suitable for him after his time is completed. The company also has an apprenticeship for coremakers, covering a period of 1½ yr. Mr. Morrin has found that there must be some sort of a definite system to make a successful apprentice course and that if a haphazard method of moving boys from job to job is resorted to, nothing will be accomplished. Neither can any success be attained without full cooperation from the heads of the plant to the sub-foreman and straw bosses.

Falk Company's Methods

H. A. Frommelt, apprentice supervisor Falk Corporation, Milwaukee, described the training methods in use at his plant. The course is divided into five divisions—machine division, steel division, pattern division, design division and operating division. In the machine division, which includes the foundry, a definite schedule of work has been laid out for apprentices, including machine and bench work, erecting shop work, and in some cases special work such as heat treating and machine estimating. These divisions are not hard and fast, and a young man who shows particular adaptabilities is given suitable experience. The steel division course includes molding, core making, heat treating, furnace milling and steel testing, inspection, etc. The pattern division has no definite branch divisions. The design division consists of one year of shop work, either machine or foundry, and two years of apprenticeship in the drafting and design department.

The operating division includes three years of definite training, one of which is given over to machine shop work, the remaining two to experience in both the boiler and engine rooms of the power plant. In addition to the definite schedules of work laid out in the shop a definite schedule of school work is also laid out, in State continuation schools, and also school

work undertaken by the company itself. In addition to this school training the company has enrolled a number of apprentices in correspondence schools in courses adapted to their special needs.

The factors which have tended to make a success of this program are proper apprentice supervision; close supervision by a person in the organization not responsible for production; close cooperation between parents and the apprentice organization; the necessity for keeping definite records of the work of the apprentice; adequate training program in each department; a system of awards or prizes in each department to bring out the best efforts of the apprentices; a real spirit of cooperation between various plants in the district, and a training program, sufficiently comprehensive to invision the needs, not only of an individual plant, but of an entire district.

W. S. Simon, supervisor of apprenticeship Industrial Commission of Wisconsin, said that while modern mass production necessitates the employment of specialty workers, there is danger in carrying it too far, as we are too likely to overlook the disastrous effects it has on the individual worker. The biggest problem of apprenticeship is selling the idea to the employer. Any foundryman who intends to install an apprentice system must first of all agree to give his whole-hearted support to the cause or it will hardly pay to begin. Because of the nature of the work and the attitude of the present day boy toward hard work, the foundries must offer unusual inducements to prospective apprentices. The beginning wage scale must be higher than is paid in any other metal trades.

The most attractive inducement that any employer can hold out to potential apprentices, however, is to guarantee them a real opportunity to learn the trade, he said. The employer who can show his apprentices that he is sincere in his desire to give them every chance to learn the whole trade will have the best chance of maintaining a successful apprenticeship system. The time to get boys is when they are attending the continuation school. While they might perhaps be too young to perform foundry work, descriptive literature of the industry will at least start many of them to thinking of it.

At Coxe Traveling Grate Co.

L. W. Klein, of the Coxe Traveling Grate Co., Port Carbon, Pa., described the methods in use at his plant. The boys are taken for three years, the entrance age being eighteen years. The first year they are placed with experienced molders as assistants, the next six months they are taught core work, and for the rest of the period are put at molding by themselves. In addition to this training the students are enrolled in correspondence schools, the company paying part of the tuition. A system of reports regarding the progress both in shop and in the school are kept.

F. W. Kirby, Deere & Co., Moline, Ill., said that the question of the proper length of training cannot be answered by a hard and fast rule. Certain fundamentals should be taught to all classes of molders, but for specialty molders only enough training is necessary to allow them to safely enter production work. There is no particular reason for holding a specialty apprentice for a definite length of time, but in the case of the all-around molder the requirements are entirely different, and the training should cover a considerable period of time. A definite period of time should be placed on all classes of training in order to obligate the apprentice for a definite period.

In all systems the training of foundry apprentices there are two distinct objectives. The first is to develop skill in semi-skilled workers in the several branches of the foundry trade, and the second is to provide the proper opportunity for developing future foremen and instructors. What appears to be the most practical plan for cooperation with manual training schools is through following up the continuation school idea. Here the apprentice would be instructed in mechanical drawing, mathematics, etc. During the course industrial lectures should be given students by practical foundrymen, dealing not only with the technical side of the foundry practice but also instilling in the minds of the students the great possibilities that are before them in the foundry industry.

At University of Minnesota

O. W. Potter, University of Minnesota, described the evening classes in foundry practice held at the University of Minnesota, as suggested by the Twin City Foundrymen's Association. The first semester was attended by ten classifications of employees, including molders, core makers, draftsmen, casting users, salesmen and pattern makers. The course was prepared with the idea of keeping everybody's interest and giving them a boiled-down, concise set of notes written in as simple language as possible. The course was composed of lectures and discussions, and at each meeting the students were given several questions to work on during the week; they also handed in questions for the instructor to answer. At the following meeting these questions were brought up in open discussion, and by having so many different branches of the foundry industry represented it was possible to get several points of view on each question. The students were furnished with typewritten copies of each lecture illustrated by blue prints and black board examples. The outlined course followed and the lecture work included drawing, materials, metallurgy, sands, refractories and fluxes, foundry economics, foundry machinery and foundry office practice.

J. A. Turner, Pittsburgh Valve & Foundry Co., described the apprentice system in his plant. No formal contract is entered into with the boys, but a mutual verbal agreement is made, with a written schedule given the boys of their training periods. At the end of each eight periods, $50 is credited to the boys, payable at the end of the course, but forfeited if the boy quits before his time is up. Educational features of the course are reduced to a minimum, but the company believes that advancement will not be hampered for the mechanic who knows his trade, as leadership qualities are innate. The company has found a good way to get boys is to seek the assistance of their own molders and industrial schools. Less lamentation and more hard work on the labor problem is what is needed in the foundry business.

Plan at Wentworth Institute

A. L. Williston, Wentworth Institute, Boston, in a paper read at the meeting, said that modern foundry practice requires men, not only with a wide range of practical skill, but with a store of technical and scientific knowledge to enable them to cope with the new kinds of problems and constantly changing conditions. Development of machine molding and rapid production methods require an ability in planning essentially in line with the engineering spirit. For leadership, breadth of view, resourcefulness and originality must be developed. Trade and technical schools are valuable in giving this training. He recommended to the association the formation of an active committee on education, and training; indorsement of all schools having special courses for foundry workers; and the establishment of scholarships in such schools. Foundrymen must stress the importance of special training on applicants for positions, and must be willing to pay for it.

John Grannan, University of Michigan, suggested that it should be the endeavor of the management to give every laborer in the foundry a chance to become a mechanic and to reward him for his efforts as he increases his skill. Every shop has a variety of work such that the skill required to make different castings can be granted. The castings requiring the most skill to make should be made the most desirable jobs in the shop and other jobs graded as to skill required. If molders' helpers were advanced to the simpler jobs and advanced to better jobs as they learned and openings occurred, molders could be developed in every shop to satisfy its needs. With the molder instructors to advise, and a rotation of jobs, a high degree of skill could be developed.

[Reports on the other sessions of the Cleveland convention of American foundrymen were published in THE IRON AGE, May 10.]

Modern British Foundry Practice

Developments in Gray and Malleable Iron and in Steel and Non-Ferrous Castings—Effect of Pouring Temperatures

BY DR. PERCY LONGMUIR

BRITISH foundry practice today owes a considerable debt to the early effective pioneering work of Professor Turner, and his investigations of the action of silicon upon cast iron* not only gave a definite impetus to foundry development, but had the further valuable incentive of turning many other workers toward systematic investigation of cast metals.

The comprehensive work of Hadfield, beginning with alloys of iron and manganese** and continued through many other possible combinations, has led to vast extensions in the field of ferrous metallurgy and consequential development of steel foundry practice.

Chemical and metallographical laboratories have proved of high value to practice. Equally on the other hand experienced practice of the foundry floor and the melting platform have proved invaluable to the laboratories.

While this united development has taken place it can but be admitted that each forward step has simply increased the extent of the unknown. After all this is but a natural law and the breasting of one hill just opens vistas of other hills yet to be climbed.

It must be remembered that 22 years ago engineering practice was receiving more attention than foundry practice. Therefore the foundry had a certain leeway to make up. During this period of making up engineering practice has not been stationary. Therefore the foundry has not only had to make up lost time but also to make the further endeavor to overtaking present development in industries whose foundation depends upon a supply of reliable castings. The extent of this achievement has been admirably shown in Mr. Cook's exchange paper of last year.

Gray Cast Iron

The range of iron ores available to the blast furnaces together with the range in practice of the furnaces affords the British iron founder a wide choice of pig iron. This choice can be supplemented by varying additions of mild steel and ferroalloys and therefore a very wide range in product is possible.

The extent of the studies devoted to this product is well shown in the proceedings of the Institution of British Foundrymen. Not only is the range in composition great but equally so is the type of casting. The development of high-speed internal combustion engines has created a series of exceedingly intricate castings and the author has unique opportunities of seeing how admirably the founder is meeting these difficulties. In weight alone the range is equally great; Riddell of Falkirk will successfully reproduce an ordinary tree leaf in cast iron, using the leaf as a pattern. T. Firth of the Brightside Foundry & Engineering Co., Sheffield, produces ingot molds weighing 106 gross tons.

Advantages and disadvantages of the iron melting cupola were well drawn in Mr. Elliott's exchange paper before the Institution of British Foundrymen in 1921. However, the ruling factor of cost supplemented by the fact of the general efficiency of the cupola melted products will require much consideration before the adoption of the duplex electric furnace process. As indicated by Desch in discussing this paper the natural economic avenue for the electric furnace is in the direction of steel castings.

In Britain work is being carried out in the direction on the one hand of increasing cupola efficiency and on the other of studies in hearth furnaces including coal, oil and gas firing. It is in one of these directions that future economic development of melting for gray iron and alloyed cast irons will take place.

THE author of this paper is one of the leading foundry experts and metallurgists of England, and was recently appointed director of research for the Institution of British Foundrymen. This paper was the annual international exchange paper contributed by the British foundrymen for this year's convention. An abstract is here reproduced. Dr. Longmuir has summarized in his paper the outstanding recent developments in British ferrous and non-ferrous foundry practice. Fortunately, he is able to report the actual working of principles, which he outlined in a series of papers before the American Foundrymen's Association 22 years ago. In 1901, in a paper entitled "The Relation of the Laboratory to the Foundry," he declared that the future of all foundry work depends upon the development of scientific methods. His paper shows how the growing use of such methods is making the British foundryman more efficient.

Malleable Cast Iron

In British practice "white heart" predominates over "black heart" so far as quantity is concerned. A good range of white, semi-mottled and mottled pig irons is available. Many of the furnaces also supply "refined" pig irons. When an open-hearth gas fired furnace is the melting medium, "refining" of the bath is permissible. Crucible melting is still largely followed, especially in the Midland area, but bulk work is generally from cupola melted metal. Coal fired reverberatory or gas fired open-hearth furnaces are utilized and the development of the industry points to the growing use of the latter.

Representative melting practice is shown in the following table:

		Method of Melting			
	Charge, Per Cent	Crucible, Per Cent	Cupola, Per Cent	Coal-Fired Reverberatory, Per Cent	Gas-Fired Open-Hearth, Per Cent
Carbon	3.50	3.40	3.40	3.20	3.20
Silicon	0.85	0.82	0.75	0.65	0.70
Manganese	0.20	0.10	0.10	0.10	0.10
Sulphur	0.25	0.30	0.31	0.27	0.26
Phosphorus	0.05	0.05	0.05	0.05	0.05

Average commercial castings give a maximum stress of from 20 to 28 tons per sq. in., with elongations of from 2 to 6 per cent in 2 in. and reduction of area of from 2 to 8 per cent. Cold bending tests on ½-in. square bars range from 45 to 90 deg. A series of commercial castings of Scottish origin tested by the author gave the following results: Analysis, silicon, 0.65; manganese, 0.15; sulphur, 0.30; and phosphorus,

*Journal of the Chemical Society, 1885.

**Manganese in its application to metallurgy—The Institution of Civil Engineers, Feb. 28, 1888.

0.04 per cent. The maximum stress in tons per sq. in. was 27.0, the elongation in 2 in. was 5.7 per cent and the reduction of area was 10 per cent.

In the field of British malleable cast iron Hadfield has done most valuable pioneering work. Reference should also be made to some promising work by Royston in 1897. Royston's early work apparently lay in the direction of an endeavor to obtain quick if not instantaneous decomposition of the hard carbides and thereby shorten the annealing time. Today this idea is well worth investigation along the lines of determining critical ranges in the near vicinity of the solidification range. A certain amount has been done in the way of laboratory experimental work, and in 1904 the author obtained this quick decomposition and resultant precipitation of temper carbon by heating to temperatures near the fusion range. However, investigation on practical lines is required in which limiting foundry conditions, influence of mass, change in section and contour of casting and resultant possibilities are included.

Table 1.—American Methods of Manufacture of Malleable Iron Castings

Analysis of Hard Iron:

Mark	Silicon	Phosphorus	Sulphur	Manganese	Combined Carbon
1	0.76	0.193	0.05	0.20	2.13
2	0.88	0.180	0.051	0.23	2.26
3	0.80	0.190	0.049	0.20	2.37

Physical Tests:

Mark	Maximum Stress, Tons per Sq. In.	Elongation, Per Cent on 2 In.	Reduction of Area of
1	26.5	36.7	38.0
2	26.1	35.9	33.2
3	25.8	25.7	30.1

In view of the masterly paper of Professor Touceda, the present author feels much diffidence in dealing with malleable cast iron. However, it cannot be denied that British malleable iron practice offers a most promising field for research. In this respect the author can only re-echo and appreciate Professor Touceda's sentiments of cooperation between the two countries.

Steel Castings

Systematic steel casting in foundries began in Britain about 1856 and Vickers was one of the first successful workers in this direction. He was followed by many workers, among whom may be mentioned Attwood, Rogerson, Spencer and Orborn. The Paris Exhibition of 1878 apparently gave an impetus to steel founding in the exhibit of the Terre Noire Co. Early developments were necessarily of the "trial" order, and naturally many errors had to be eliminated.

In this patient, persistent work lies the foundation of the steel casting industry of today. This early practical work, followed by the researches of Hadfield, Stead, Arnold, McWilliam and many other workers, not only opened up scientific possibilities but further led to united practical and scientific attack on the problem of steel casting.

In today's commercial practice crucible melting is followed to a limited extent only. The bulk of the castings are produced from acid and basic open-hearth furnaces, bottom or surface blown converters. The electric furnace is gaining ground in steel foundry practice and by virtue of its elasticity offers an excellent medium for the production of special and alloy steel castings.

Generally speaking, the metallurgy of steel castings has as its first concern the determination of the most suitable composition to meet the required mechanical properties. Secondly, the process, whether open-hearth, surface blown or electric, should finish with a bath of "killed" or dead metal steel. This is achieved by judicious conduct of process and judicious use of deoxidizers. In regard to process it is possible to produce high purity with little or no addition. The following pure iron casting, analyzing carbon, 0.04; silicon, 0.02; manganese, 0.07; sulphur, 0.02; and phosphorus, 0.02 per cent, was crucible melted and killed with a trace of aluminum:

	Yield Point, Tons	Max. Stress, Tons	Elongation, Per Cent 2-In.	Reduction Area, Per Cent
As cast.....	10.7	19.8	30.0	39.0
Annealed ..	9.1	19.2	46.0	65.0

Purity of this type is hardly commercial, but at the same time the results give the properties of pure iron in the cast and treated condition.

Additions of carbon to such an iron would progressively stiffen it, but experience has shown that carbon alone is not sufficient, at any rate so far as castings are concerned. For this reason the two most familiar deoxidizers — silicon and manganese — are either singly or combined added to leave a predetermined excess in the finished steel.

A steel casting containing carbon, 0.34; silicon, 0.15; manganese, 1.58; sulphur, 0.06; and phosphorus, 0.06 per cent, gave the following values:

	Yield Point, Tons Sq. In.	Maximum Stress, Tons per Sq. In.	Elongation, Per Cent on 2 In.	Reduction of Area, Per Cent	Bending Angle, Degrees
As cast.....	23.1	35.8	8	9	33
Annealed ..	17.3	32.1	21	28	180

The influence of special elements is naturally a very large field and the results are given as representing only a small section of this field in Table 2:

*Table 2.—Nickel Steels in the Cast Condition Reheated to and Cooled from 800 Deg. C.**

Contents of Nickel	Carbon	Manganese	Yield Point, Tons per Sq. In.	Maximum Stress, Tons per Sq. In.	Elongation, Per Cent on 1.75 In.	Reduction of Area, Per Cent
Nil	0.47	0.95	19.24	38.49	15.42	16.26
1.20	0.48	0.79	22.07	43.23	14.28	14.88
2.15	0.47	0.86	25.79	42.84	17.70	23.51
4.25	0.40	0.82	28.11	43.49	13.10	17.94
4.95	0.42	1.03	36.00	56.09	14.28	24.43
6.42	0.52	0.92	37.13	57.51	6.20	8.42
7.95	0.43	0.79	41.47	74.03	4.50	5.68
12.22	0.41	0.85	39.85	71.19	6.20	6.88
15.98	0.45	0.83	31.59	76.55	4.00	4.21
19.91	0.41	0.96	17.94	29.69	14.30	19.05

*From Seventh Report to the Alloys Research Committee, Iron, Nickel, Manganese, Carbon, Alloys. Carpenter, Hadfield & Longmuir.

Non-Ferrous Foundry Practice

Possibly in no branch of foundry practice are accurate analyses so vital as in the case of brass and bronze foundries. The comparatively high intrinsic value of the constituent metals amply justify any cost incurred in checking raw materials.

British melting practice embraces coke fired crucible, coal fired reverberatory furnaces and various types of oil or gas fired furnaces.

The range in type of alloys produced is infinite and practice here seems to cover every possible variety of combination. Two important practical points are worth mentioning:

From an economic point of view the strict classification of scrap into its respective grades, including borings and turnings.

Making good volatilization losses before casting. This is of special importance in the case of high tension brasses, the foundation of which are in the neighborhood of 60 per cent copper and 40 per cent zinc. Irrespective of any third metal present, it is imperative that any zinc losses during melting be made good before casting.

Typical physical properties of commercially sand cast alloys are given in the following table:

Alloy	Copper	Zinc	Tin	Maximum Stress, Tons per Sq. In.	Elongation Per Cent on 2 In.
Red brass.....	90.0	10.0	...	12.6	26.0
Yellow brass..	70.0	30.0	...	13.0	43.0
Muntz metal...	60.0	40.0	...	19.0	15.0
Gun metal....	88.0	2.0	10.0	18.0	11.0
Gun metal....	86.0	4.0	10.0	17.0	10.5
Gun metal....	87.0	5.0	8.0	15.0	9.0

A Characteristic Feature Common to All Castings

There are many features common to all grades of castings. Liquid shrinkage, solid contraction and its resultant warping are familiar to all founders, varying in intensity according to the type of metal or alloy handled. At the moment it is impossible to touch on these interesting features, but there is one common characteristic on which the author would like to dwell for a few moments. This is the influence of varying casting temperature on the physical properties of cast metals and alloys.

Some years ago hard practical experience in the

production of high-pressure fittings led to the recognition that for a given metal or alloy, one range of pouring temperature would produce a pressure-tight casting while another pouring temperature from the same ladle would result in a porous casting.

Detailed investigation gave results of the order shown in the following tables:

Metal	Casting Temperature, Deg. C.	Maximum Stress, Tons per Sq. In.	Elongation, Per Cent in 2 In.
Zinc	580	1.30	....
	528	1.81	....
	491	1.37	....
Aluminum	725	4.48	2.5
	691	5.62	8.5
	662	5.12	5.0
Copper	1,500	6.60	8.5
	1,446	7.80	11.0
	1,141	8.80	8.0
Lead	580	1.13	18.0
	430	1.43	35.0
	360	1.30	42.0

GRAY CAST IRON

C.C.	Gr.	Si.	Mn.	S.	P.	Casting Temperature, Deg. C.	Maximum Stress, Tons per Sq. In.
0.52	3.4	1.78	0.28	0.04	0.27	1,400	9.7
						1,350	14.1
						1,245	10.6

MALLEABLE CAST IRON

Casting Temperature, Deg. C.	As Cast, Maximum Stress, Tons per Sq. In.	Annealed, Maximum Stress, Tons per Sq. In.	Heated to 1000 Deg. C., Slowly Cooled
1,320	10.7	20.6	18.6
1,230	15.9	29.2	24.0
1,120	12.1	26.5	21.6

ANNEALED STEEL CASTINGS

C.	Si.	Mn.	S.	P.	Casting Temperature	Maximum Stress, Tons per Sq. In.	Elongation, Per Cent on 2 In.
0.29	0.07	0.16	0.07	0.06	High	24.2	9.5
					Fair	27.2	24.0
					Medium	27.0	12.5
					Low	25.5	8.0

ALLOYS

Alloy	Casting Temperature	Maximum Stress, Tons per Sq. In.	Elongation, Per Cent on 2 In.
Gun metal	High	8.38	5.5
	Fair	14.84	14.5
	Low	11.02	5.0
Yellow brass	High	11.48	37.7
	Fair	12.71	43.0
	Low	7.45	15.0
Red brass	High	6.85	13.2
	Fair	12.65	26.0
	Low	5.67	5.5
Muntz metal	High	12.45	6.0
	Fair	18.89	15.0
	Low	16.29	9.5

The foregoing results are selected from a large series, and in each instance represent the contents of one crucible or one ladle: the method being to superheat the metal or alloy and pour one set of bars at the "high" heat; the crucible then being allowed to stand until the temperature had fallen to the "fair" heat and then pour the second set. The third set or "low" heat represents the lowest safe pouring temperature.

The physical results given show within the contents of one crucible a wide range of properties due to casting temperature alone. An equally wide range is found if a series of valve bodies are cast from one crucible from very hot metal at intervals down to as low a fluidity as is possible. The castings corresponding to the "fair" heat will be tight to internal pressure, while on either side of the "fair" zone there will be porosity.

Although many actual casting temperatures have been determined, only comparatively few have been quoted in terms of degrees Cent.; this for the reason that there cannot possibly be a constant "fair" casting temperature for any given alloy to cover every type of casting made in that alloy. Correct casting temperature must necessarily vary with the contour and section of the castings, and it is in this direction that trained foundry judgment can exercise its skill to the advantage of the product.

Finally the author expresses his sincere regret that circumstances will not permit him to be present when this paper is read. He can, however, take comfort by regarding this present absence as a pleasure deferred and hope that on some future occasion that pleasure will be realized.

British Machine Tool Exports

The 1921 British machine tool exports separated as to countries of destination are now available from the Department of Commerce, Washington. Details of the 1922 exports by countries of destination are not yet available.

The amount of the total machine tool exports of the United Kingdom in 1921 (£2,887,415) exchanged into United States currency at the average annual rate of $3.849056 is equal to $11,113,822.

Total exports of machine tools from the United Kingdom during 1922, as shown in the United Kingdom monthly report for December, 1922, amounted to £1,530,811. The countries of destination of 1922 exports are not yet available.

United Kingdom exports of machine tools in 1921 showed a decrease of 14 per cent from those of 1920. In 1922, however, these exports decreased 47 per cent over those of the preceding year, i.e., 1921.

The decrease of 1922 exports compared with those of 1920 (the peak year) was 54 per cent.

Building Activity Slackened in April

Reports of a slackening of building activity in April, as conveyed in market reports of THE IRON AGE, are borne out by the figures compiled by the F. W. Dodge Corporation, which show that the increase over March in thirty-six Eastern States was only 7 per cent, whereas April normally shows an increase of 15 to 20 per cent over March. Total contracts awarded during April in the thirty-six Eastern States amounted to $399,243,000. In twenty-seven of these States the record shows an increase of 1 per cent over April of last year.

Construction started from Jan. 1 to May 1, 1923, shows an increase of 15 per cent over the same period last year. On April 1 the record showed an increase of 23 per cent over last year. Another important item in the April record is the reduced volume of contemplated new work (pre-contract stage) reported. The amount reported for the thirty-six States in April was $653,805,000, a decrease of 17 per cent from the amount reported in March. The Southern district was the only one reporting an April increase in contemplated work.

The April record in detail included the following items: Residential buildings, $175,129,000, or 44 per cent; public works and utilities, $67,228,000, or 17 per cent; business buildings, $53,826,000, or 13 per cent; educational buildings, $39,803,000, or 10 per cent; industrial buildings, $33,335,000, or 8 per cent.

Manganese Ore from Brazil

WASHINGTON, May 15.—Total exports of manganese ore from Brazil last year were 340,706 tons, an increase over 1921, but less than during 1920, says a report received by the Department of Commerce from Commercial Attaché W. L. Shurz, Rio de Janeiro.

The report presents the following figures as to exports, in gross tons: 1922, 340,706; 1921, 275,694; 1920, 453,737; 1919, 205,725; 1913, 122,300.

The manufacture of the Cadillac single- and double-end centering and drilling machines and also the bench centers, formerly manufactured and sold by the Cadillac Machinery Co., Detroit, has been taken over by the Rockford Milling Machine Co., Rockford, Ill. In addition to the line of standard machines, improvements in the design of which will be made, special machines and attachments for drilling and centering work will be offered by the Rockford company.

SOME PRICES LOWER

Raw Materials Easier in Youngstown District—Inquiry Is Improving

YOUNGSTOWN, May 15.—Improved inquiry is appearing for iron and steel products, state district interests, following a lull in demand. It is the impression among leading independent interests that business has sufficient momentum to carry it through the remainder of the year. The market is more stabilized and less hectic than it was earlier in the year, and prices show more conformity to a stabilized market.

Producers express themselves as well satisfied with the letup in pressure demand, which they declare is not a healthy state of business. Both sellers and buyers are showing commendable conservatism, states a leading interest. Buying is not far ahead and the volume of orders is good. Specifications against contracts are such as to maintain shipments at a rate near capacity.

Railroads are heavy buyers and are absorbing everything they have placed on makers' books. Less active demand is expected from building construction.

Prices of raw materials, including coal, coke and scrap metals, are softer. For instance, blast furnace coke has recently been sold in the Youngstown district at $4.50 per ton, the transaction involving 25 carloads of distress tonnage on wheels. The spot furnace coke market ranges from $5 to $5.75, while for third quarter and second half prices of $6 per ton and higher are being asked.

Numerous consumers are now preparing to cover on their last half requirements and a heavy volume of business may be shortly expected.

Coal prices are also down, steam coal, run-of-mine, being offered freely at $2, f.o.b. mine. Opening of lake navigation and diversion of coal to the Northwest has done little as yet to stimulate coal prices. Manufacturers report they are receiving ample supplies, and attribute the satisfactory condition of the market to exceptional railroad service.

Black sheets are still obtainable in this territory for fairly early delivery, and at recent prices. Buyers will be able to secure delivery from some makers in four weeks.

Continued Activity in the Valleys

YOUNGSTOWN, May 15.—Iron and steel properties continue at a high operating rate in the Mahoning and Shenango valleys. Scheduled resumption this week of the McKeefrey blast furnace at Leetonia will increase the total active stacks in the Youngstown district to 41, of 46.

Sheet mills still find it difficult to maintain an adequate labor supply, though the tightness of the labor situation has eased somewhat the past two weeks.

"Labor supply is somewhat more plentiful," states James A. Campbell, president of the Youngtown Sheet & Tube Co. "We are able to get common labor and when immigration starts after July 1, when the new quota year begins, we will be able to secure more men for next fall."

Pipe and strip mills are operating at a rate close to capacity, but puddle departments are held back through lack of skilled labor.

Foundry Sands in Minnesota

Foundry sands for core and form making, formerly brought into Minnesota by hundreds of carloads annually, are now obtained almost altogether within the boundaries of the State as a result of discoveries by the geological survey conducted by the University of Minnesota, Prof. W. H. Emmons, director of the Minnesota Geological Survey and head of the department of geology, has revealed.

An abundance of the sands used in brass founding and casting, most of which were formerly brought from Albany, N. Y., and some from as far away as France, has been found in southeastern Minnesota, according to Mr. Emmons. Everything in the way of foundry sands needed by the more than 40 foundry establishments in Minnesota can now be obtained within the boundaries of the State with the exception of fire clay. No fire clay has been found.

Foundry sands, now obtained within the State for $2 or $3 a ton, formerly cost nearly that much in freight in many instances. Those brought from France cost vastly more than that in freight only, Mr. Emmons pointed out. The French brass sand cost about $15 a barrel. Its exact equivalent is now obtainable in Minnesota.

Bulletin No. 18 of the Minnesota Geological Survey, soon to be off the press, gives the results of the investigation. It was written by G. N. Knapp and edited by Professor Emmons.

Tonnage Rate of Sheet Mill Workers Advanced

Tonnage rates for sheet mill workers operating under the sliding scale wage agreement of the Amalgamated Association of Iron, Steel and Tin Workers advance 3 per cent of the base rate for the May-June period as a result of the bi-monthly settlement conducted last week at Youngstown.

The average price of Nos. 26, 27 and 28 gage black sheet shipped during the 60-day period ending April 30 by mid-Western mills was $3.40 per 100 lb., an advance of 10c. over the settlement two months before, when the average was $3.30.

This entitles affected employees to a proportionate increase in the base rate.

The price of tin plate remained unchanged at $4.80 per base box, and there is therefore no change in the rates paid tonnage workers.

The examination was conducted at Youngstown between representatives of the Amalgamated Association and the Western Sheet and Tin Plate Manufacturers' Association. James H. Nutt acted for employers and M. F. Tighe of Pittsburgh for employees.

Brier Hill Improvements Postponed

Owing to high construction costs, the Youngstown Sheet & Tube Co., Youngstown, has deferred for the time being proposed changes and improvements affecting the recently acquired Brier Hill plants.

It is reported that 75 per cent of the copper produced in Canada during the year 1922 was the output of British Columbia mines, despite the fact that owing to conditions of the market that province produced less copper than for any like period in the last 20 years. The output of copper for 1922 amounted to 43,321,402 lb., while that of British Columbia was 32,432,521 lb. Ontario accounted for nearly the whole of the remainder, the production of that province being 10,888,882 lb. With Britannia and Copper Mountain producing, it is estimated that by the end of 1923 the production of copper will be up to the highest point in the history of British Columbia, about 80,000,000 lb. a year. In 1916 a high record for British Columbia production was made when the output totaled 65,379,364 lb.

Eight additional sets of specifications for metals have been submitted for approval to the American Engineering Standards Committee by the American Society for Testing Materials. They are specifications for: Manganese-bronze ingots for sand castings; the alloy; copper 88 per cent, tin 10 per cent, zinc 2 per cent (government bronze, gun metal); brass forging rod; free-cutting brass rod for use in screw machines; naval brass rods for structural purposes; brass ingot metal, graded and ungraded, for sand castings; solder metal (soft solder) and high sheet brass.

The Ferguson-Allan Co., Inc., 504 Bailey Ave., Buffalo, locomotive repair work, expects to build an addition that will double present capacity. Plans have not been drawn.

SIMPLIFIED GEAR HOBBER

Machine Designed for Unusual Accuracy in Quantity Production—Indexing Mechanism a Feature

Extreme accuracy combined with quantity output, the economical production of both finished gears and gears which are to be ground later, the grinding in the latter case being confined to correcting only the inaccuracies introduced in hardening, are among the claims for the "simplified gear hobber" recently placed on the market by the Cincinnati Gear Cutting Machine Co., Cincinnati. The machine is intended to permit of the continuous production of high class gears without the necessity for repeated and inconvenient adjustments.

The machine, views of which are shown herewith, is arranged for cutting gears of only one pitch and one number of teeth, but is easily adapted to cutting other pitches and numbers of teeth within its range. The capacity is for steel gears up to 7 in. in diameter, 4½ in. face and 4 diametral pitch. The simplicity of the indexing mechanism, the comparatively few parts and the rigid and compact construction of the machine are features. The work is carried on a spindle and fed out over the hob, the movement of the latter being that of rotation only.

Simplified Gear Hobber for the Quantity Production of Gears of Extreme Accuracy. The view at the left shows position of hob and work at end of operation. View at the extreme left is of the right hand end of the machine, and shows hob spindle housing and other details. The seven parts constituting the indexing mechanism, an outstanding feature of the machine, are shown below

The hob spindle is hardened and ground and is provided with two opposed tapered bearings running in adjustable bronze bushings. There is a thrust collar between the two bearings so that adjustment of one bearing will not affect that maintained in the other. Any size or bore of hob may be used in the machine, but a hob of at least 4 in. diameter with a narrow face and a 2 in. bore is recommended.

The hob spindle housing is bored from the solid at the correct angle of the hob, and carries, in addition to the cutter spindle, the flywheel and its 8-thread driving worm. The flywheel, which weighs about 300 lb., is mounted directly on the end of the cutter spindle and not on an auxiliary shaft, so that its momentum and balancing effect are carried directly to the hob. The hob is set for the proper depth of cut and adjusted to suit the diameter of the gears by a radial movement of the housing which is imparted by the micrometer jack below the chip pan. This radial movement centers about the index driving shaft. The machine is furnished with the hob spindle housing bored to the proper angle for cutting gears of any one pitch. The housings are made interchangeable, however, and by securing the proper housings, a machine can be converted for cutting gears of other pitches.

The work spindle is 6¾ in. in diameter, hardened, ground and lapped, and mounted in adjustable bronze bearings tapered on the outside. The size of the work spindle and the design of the bearings, as in the case of hob spindle, eliminates need for outer supports.

The entire indexing train is made up of the seven parts illustrated, which include both the hob and work spindles. There are only two gear contacts and one heavy shaft in the indexing train. A pair of bevel gears driven directly from the hob spindle is connected to the index master gear and its driving pinion by the single shaft. The index master gear is mounted directly on the end of the work spindle, and the proper relation between the rotation of the hob spindle and the work spindle is maintained through these four gears. The spur gears are cut with extreme accuracy, but any error which might enter through wear becomes insignificant when transmitted to the work because of the comparative size of the master gear, which is approximately 34 in., to the size of the work. Machines are equipped with indexing gears and pinions for cutting one number of teeth only; for other numbers the master gear and pinion are changed. Change of cutter speed is by changing the line shaft pulley.

Feeds are obtained by means of a lead screw running in a nut mounted inside the work spindle. The rotation of the work spindle in indexing advances the spindle and its work according to the feed or lead provided. Change of feed is obtained by changing the lead screw and nut, which is a simple operation. Return is obtained by revolving the lead screw.

The machine is arranged for rapid traverse so that when tripped by the operator work advances rapidly to the cutter, trips into the proper feed, passes through the cutter to the completion and automatically stops. Work is removed in this position, the machine tripped by the operator, then, through a quick return, the work spindle is drawn back into loading position and the cycle repeated.

Iron and Steel Exports Best Since June

March Movement 30,000 Tons Above February—Almost Up to 1922 Average—About 5 Per Cent of Our Finished Steel Production Shipped Abroad

WASHINGTON, May 15.—Exports of iron and steel in March, 1923, totaled 163,920 gross tons, valued at $17,981,180, an increase of 30,018 tons over February with a total of 133,902 tons. A sharp increase also was made in the value of machinery exports in March, when it was $24,300,160 as compared with $18,816,063 in February.

The largest item of steel exports in March was steel rails, with a total of 24,283 tons, of which 8545 tons went to Japan, the heaviest foreign buyer of rails in March, while Canada ranked second, taking 7484 tons. New Zealand took 400 tons while, according to the official records of the Department of Commerce, only one ton had gone to that country during the preceding eight months. Of the rail exports in March, 22,841 tons weighed 59 lb. or more per yard.

One of the most interesting items in the export list

Metal Working Machinery Exports

	February, 1923		March, 1923	
	No.	Value	No.	Value
Lathes	50	$29,041	85	$57,728
Boring and drilling machines	174	18,409	237	47,543
Planers, shapers and slotters	4	6,558	18	10,786
Bending and power presses	14	23,705	19	7,850
Gear cutters	11	11,276	7	11,199
Milling machines	22	28,302	23	32,774
Thread-cutting and screw machines	75	36,328	54	39,991
Punching and shearing machines	10	7,062	27	7,724
Power hammers	8	6,504	49	24,791
Rolling machines	6	3,120	2	4,038
Sharpening and grinding machines	2,737	70,085	1,639	101,072
Chucks, centering, lathe, drill and other metal-working tools	2,191	18,778	1,953	20,847
Pneumatic portable tools	1,763	32,897	833	49,766
Total	7,065	$292,065	4,946	$416,109

Exports of Iron and Steel—Gross Tons

	March		Nine Months Ended March	
	1922	1923	1922	1923
Pig iron	2,724	2,881	19,697	25,239
Ferromanganese	81	‡1,000	684	1,430
Ferrosilicon	51	242	363	754
Scrap	5,736	4,166	27,733	27,322
Ingots, blooms, billets, sheet bar, skelp	10,002	11,416	27,482	79,654
Iron and steel bars	13,285	15,468	31,046	119,534
Alloy steel bars*	2,832	212	4,095	2,108
Wire rods	8,511	2,650	70,946	14,103
Plates, iron and steel	13,589	11,891	80,197	72,691
Sheets, galvanized	10,065	12,372	53,309	75,601
Sheets, black steel	37,964	8,423	211,718	68,672
Sheets, black iron	1,162	755	4,540	7,509
Hoops, bands, strip steel	3,188	3,093	16,655	26,622
Tin plate, terne plate, etc.	6,713	7,028	59,438	49,749
Structural shapes, plain material	7,982	12,487	79,117	78,196
Structural material, fabricated	2,575	4,894	14,025	66,010
Steel rails	26,066	24,283	154,787	173,136
Rail fastenings, switches, frogs, etc.	2,499	2,767	12,013	27,187
Boiler tubes, welded pipe and fittings	19,366	13,287	112,898	119,554
Cast iron pipe and fittings	2,587	2,784	19,620	38,069
Plain wire	13,538	6,708	47,319	61,347
Barbed wire and woven wire fencing	4,822	6,751	20,216	58,747
Wire cloth and screening*	50	84	213	1,267
Wire rope and cable*	616	488	1,363	4,186
Wire nails	7,059	2,050	33,839	22,053
All other nails and tacks	1,087	939	4,663	5,794
Horseshoes	34	26	396	840
Bolts, nuts, rivets and washers, except track	1,654	1,542	9,789	13,699
Car wheels and axles†	1,794	1,630	4,528	12,437
Iron castings†	871	1,153	2,442	7,793
Steel castings†	147	234	683	1,385
Forgings†	178	216	451	1,598
Machine screws†	15	....	43	.....
Total	208,843	163,920	1,126,308	1,264,286

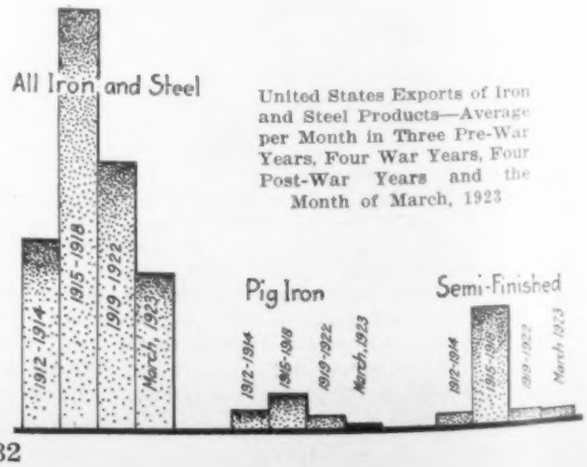
*Not reported separately, prior to January, 1922.
†Previous to January, 1922, reported by value only.
‡Record indicates this is spiegeleisen.

Machinery Exports

By Value

	March, 1922	March, 1923	Nine Months March, 1922	Ending March, 1923
Locomotives	$112,243	$631,220	$16,874,931	$4,635,472
Other Steam Engines	60,690	43,653	1,319,646	1,486,382
Boilers	52,228	32,496	1,196,357	940,554
Accessories and Parts	123,215	62,017	*302,901	800,534
Automobile Engines	526,177	646,276	1,734,725	2,975,199
Other Internal Combustion Engines	387,163	421,462	2,412,849	3,580,724
Accessories and Parts for	217,726	897,656	607,712	2,116,985
Electric Locomotives	14,553	492,878	1,416,503	2,291,112
Other Electric Machinery and Apparatus	164,458	249,843	835,316	1,690,974
Excavating Machinery	125,299	250,625	1,878,359	1,176,528
Concrete Mixers	37,308	25,129	244,933	390,203
Road Making Machinery	28,987	57,627	*75,447	359,136
Elevators and Elevator Machinery	321,626	324,274	*937,381	3,348,801
Mining and Quarrying Machinery	616,675	802,075	*3,700,300	5,700,512
Oil Well Machinery	462,907	499,895	*866,189	3,454,892
Pumps	551,404	661,370	4,143,147	4,924,827
Lathes	106,519	57,728	848,767	519,143
Boring and Drilling Machines	51,097	47,543	*171,744	395,248
Planers, Shapers and Slotters	198,844	10,786	*52,425	181,328
Bending and Power Presses	13,511	7,850	*191,344	128,999
Gear Cutters	1,278	11,199	*11,885	106,301
Milling Machines	25,817	32,774	*64,177	345,251
Thread Cutting and Screw Machines	19,368	39,991	*38,699	230,395
Punching and Shearing Machines	9,171	7,724	*54,554	99,144
Power Hammers	10,477	24,791	*33,725	113,828
Rolling Machines	7,067	4,038	*7,428	144,009
Sharpening and Grinding Machines	56,584	101,072	612,303	682,592
Other Metal Working Machinery and Parts of	440,256	328,469	5,474,539	4,308,312
Textile Machinery	1,212,404	906,534	12,964,771	7,448,307
Sewing Machines	554,894	679,393	4,111,109	6,352,098
Shoe Machinery	103,478	127,369	782,353	894,889
Flour-Mill and Gristmill Machinery	140,849	76,553	656,675	832,103
Sugar-mill Machinery	135,262	114,238	3,632,521	3,171,534
Paper and Pulp Mill Machinery	184,042	394,390	2,118,879	1,496,463
Sawmill Machinery	67,365	74,713	488,293	456,821
Other Woodworking Machinery	66,933	101,191	784,154	1,134,883
Refrigerating and Ice Making Machinery	224,097	161,376	1,433,212	1,455,524
Air Compressors	110,531	354,523	1,297,158	1,884,526
Typewriters	1,340,840	1,172,123	7,389,208	9,027,420
Power Laundry Machinery	60,519	53,946	403,248	975,436
Typesetting Machines	368,036	486,014	2,154,217	2,786,037
Printing Presses	356,638	409,197	3,827,823	3,327,810
Agricultural Machinery and Implements	2,535,546	3,709,743	14,596,639	24,532,128
All Other Machinery and Parts	7,757,262	8,706,396	81,178,670	73,560,848
Total	$19,961,344	$24,300,160	$183,927,216	$186,064,213

*Jan. 1 to March 31 only.



United States Exports of Iron and Steel Products—Average per Month in Three Pre-War Years, Four War Years, Four Post-War Years and the Month of March, 1923

Exports, January, 1921, to March, 1923, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
*Average, 1912 to 1914..	2,406,218	221,582	145,720
*Average, 1915 to 1918..	5,295,333	438,462	1,468,026
Calendar year 1919....	4,239,837	309,682	258,907
Fiscal year 1920.....	4,212,732	248,126	288,766
Calendar year 1920....	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921.....	4,168,619	129,541	82,549
July	86,523	2,744	363
August	75,827	2,424	2,447
September	95,169	3,078	1,318
October	106,582	2,830	153
November	125,511	1,299	1,869
December	134,415	2,550	250
Calendar year 1921....	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,430	6,627
March	208,843	2,724	10,002
April	198,830	2,750	9,376
May	230,062	3,897	13,091
June	212,295	1,996	13,178
Fiscal year 1922.....	1,721,418	28,330	63,127
July	157,169	1,943	10,149
August	145,640	1,791	9,353
September	129,475	5,203	6,810
October	132,924	1,553	8,364
November	127,782	3,464	7,157
December	150,170	3,136	8,449
Calendar year 1922.....	1,986,297	30,922	107,201
January, 1923	123,190†	2,482	10,563
February	133,902	2,786	7,733
March	163,920	2,881	11,416
Nine months	1,264,286	25,239	79,654

*Calendar years. †Revised.

covers 1000 tons credited to ferromanganese and spiegeleisen for March, 1923. These two products are lumped together in the official classification and it is assumed that, inasmuch as the total value of the 1000 tons is placed at $32,418, the shipment consisted largely if not entirely of spiegeleisen. The entire tonnage went from the Philadelphia district to Belgium. This movement is understood to be a reflection of inquiries sent out by Belgian consumers for tonnages of spiegeleisen, ferromanganese, basic pig iron, etc., shortly after the Ruhr was occupied by military forces. Of the 15,468 tons of iron and steel bars exported in March, 14,175 was steel bars.

Exports of machine tools in March totaled 4946, valued at $416,109, as against 7065 valued at $292,065 in February, an increase being made in the value of all the items in this list with the exception of bending and power presses and gear cutters.

Exports of Steel Products by Countries of Destination

	Gross Tons	
	March, 1923	Nine Months Ended March, 1923
Galvanized Sheets		
Canada	2,976	21,462
British India	2,503	8,069
Cuba	1,273	5,377
Philippine Islands	767	8,930
Colombia	731	3,444
Chile	508	2,270
Mexico	482	3,980
Argentina	446	3,913
Black Steel Sheets		
Canada	5,650	38,864
Japan	1,735	20,349
Tin Plate		
Japan	2,153	14,405
Canada	1,880	14,668
Italy	580	1,094
Cuba	496	1,888
Steel Rails		
Japan	8,545	67,324
Canada	7,484	19,409
Cuba	2,144	27,809
Chile	2,116	5,123
Honduras	609	6,606
Philippine Islands	514	5,703
New Zealand	400	401
Galvanized Wire		
Japan	1,411	4,698
Canada	1,050	10,500
Australia	978	8,615
Argentina	889	13,430
Barbed Wire		
Argentina	1,291	9,199
Australia	866	6,875
Brazil	795	10,897
Canada	753	3,349
West Indies	750	6,870
Colombia	460	4,513
British South Africa	447	3,752

Exports from United States
(Gross Tons)

Average Month	All Iron and Steel	Pig Iron	Semi-Finished Material
Calendar Year 1912 to 1914..	200,536	18,465	12,143
Calendar Year 1915 to 1918..	441,278	36,579	122,336
Calendar Year 1919 and 1920..	383,404	21,985	19,825
Calendar Year 1921 and 1922..	174,972	2,468	4,898
March, 1923.....	163,920	2,881	11,416
Per cent of pre-war.....	81.75	15.6	94.0

Heavy Wage Payment at Youngstown

YOUNGSTOWN, May 15.—At $6,055,552 the April wage bill showed a gain of $87,208 over the preceding month and with the exception of February was the largest wage distribution for any month since January, 1921. In that month the distribution was $6,872,805.

The wage distribution the first four months of 1923 was $23,511,821 or at the annual rate of $70,500,000 as compared with $14,297,459 the corresponding 1922 period, at the annual rate of $43,000,000.

Total bank withdrawals in April jumped to $68,925,485 as compared with $48,905,061 the preceding month.

Wages distributions here by months since the opening of 1921 are:

	1923	1922	1921
January	$5,386,998	$3,272,988	$6,872,805
February	6,100,937	3,383,142	5,989,744
March	5,968,344	3,570,422	4,382,548
April	6,055,552	4,070,907	4,401,960
May	.....	4,222,021	4,047,641
June	.....	4,687,976	3,764,116
July	.....	4,226,181	3,323,982
August	.....	4,404,765	3,349,974
September	.....	4,718,494	3,426,002
October	.....	5,629,494	3,441,761
November	.....	5,739,475	3,645,873
December	.....	6,120,617	3,738,335
Total	.....	$54,046,482	$50,384,741

Sheet Mill Hours and Wages

WASHINGTON, May 15.—The United States Department of Labor, through the Bureau of Labor Statistics, has published a summary regarding wages and hours of labor in representative sheet mills of the United States.

As shown by a combination of the data for the principal productive occupations, the average earnings per hour in this branch of the iron and steel industry in 1922, as compared with 1920, show a decrease of 36 per cent; as compared with 1913, an increase of 47 per cent; and as compared with 1910, an increase of 75 per cent. The changes in average full-time weekly earnings in a general way followed the changes in hourly earnings.

Average customary full-time hours decreased 1 per cent between 1910 and 1920, with slight variations in intervening years.

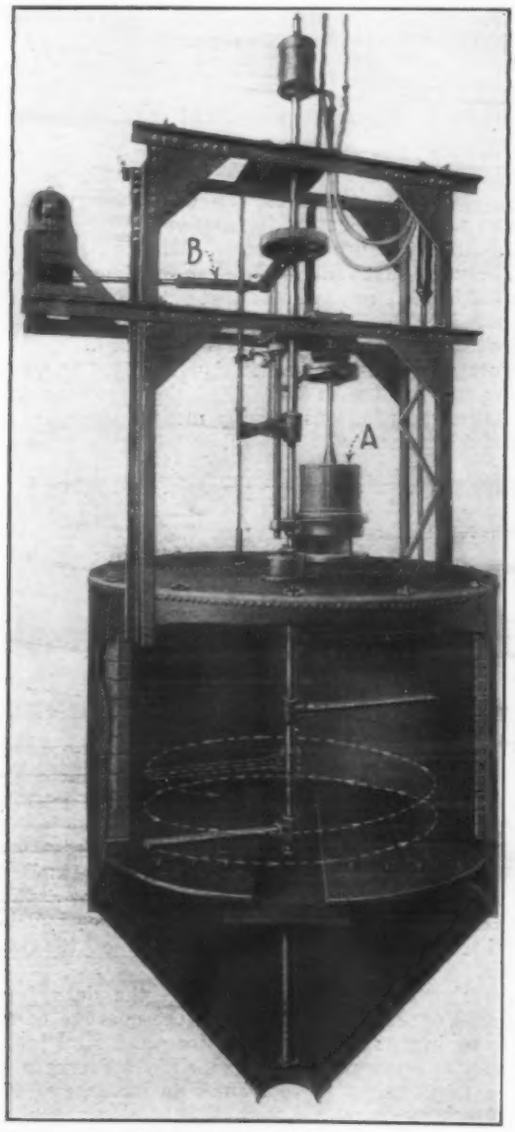
Rollers in 1922 earned $82.84 per week, average, in 43.8 hr., the hourly rate being $1.894, against $2.976 per hr. and $129.10 in 43.4 hr. in 1920. These figures compare with $1.476 and $63.21 in 42.8 hr. in 1913 and with $1.242 and $52.98 in 42.7 hr. in 1910.

The Universal Steamship Co., a new Detroit organization, will specialize in the transportation of automobiles between Detroit, Chicago, Milwaukee and other lake ports. Four lake freighters have been chartered for the purpose and will also carry miscellaneous freight in addition to motor vehicles.

NEW AUTOMATIC GAS PRODUCER

Mechanical Agitation of Fuel Bed in Stationary Producer Body

Automatic equipment has been developed by the Gas Producer & Engineering Corporation, 115 Broad Street, New York, in connection with the Galusha gas producer, for agitating the fuel bed. As shown in the illustration, the device consists of a vertical tube in the axis of the producer, with either one or two arms extending horizontally. The axial tube is rotated slowly and at the same time raised or lowered, the vertical movement being about 2½ in. per revolution. By this means every part of the contents receives a movement from the rotating arm, which is depended upon to avoid the formation of clinkers and to keep the fuel bed uniform from top to bottom. This arrangement is said to have an advantage in not opening up vertical passages through which air might force its way and thus consume some of the gas and produce CO_2.



Cut-Away Section Showing Operation of the Agitating Arms in the New Galusha Gas Producer

Numerous automatic attachments to the device are included. The axial tube is fitted with an internal copper tube carrying cooling water with positive circulation to the outer ends of each horizontal arm. There are automatic stops at top and bottom of the vertical motion, which prevent running the apparatus into danger, while the bottom position is so adjusted that the rotating arm will press a certain amount of ashes through the grate bars into the hopper below.

A conical fixture in the shape of a petticoat on the axial shaft (not shown in the illustration) deflects the coal falling through the hopper shown at *A*. When the cone is near the top this coal is thrown to the edges of the fuel bed. When the cone is near the bottom the coal is deposited near the center, and similarly with intermediate positions.

Feeding of coal through this hopper is also automatic. Coal is received from an overhead bunker through a chute (not shown). Entering the hopper, it rests upon a plate containing a hole, immediately beneath which is another plate, also containing a hole. The latter revolves slowly and, when the two holes coincide, the coal drops through into the producer. In the meantime the connection through the hopper to the upper air has been shut off automatically to prevent escape of gas. As the plate continues to revolve the connection between the hopper and the producer is again shut off, after which the opening above once more admits a measured quantity of coal.

Ashes collect in the inverted cone at the bottom, whence they may be drawn off at convenient intervals—once in 24 hr. being usual. Removal of ashes does not disturb the fire or stop gas production. There is no water used about this producer except for cooling the agitating bars and the ashes are removed dry.

While the rotation of the agitating arms is automatic, it is within easy control of the operator, who can adjust the rate of rotation over a considerable range. The ratchet arm over the motor contains a heavy spring shown at *B*, which takes up any strain which might be occasioned by the presence of a clinker or foreign substance in the fuel bed. This promotes flexibility and avoids the necessity for shutting down the plant to make a repair. A producer fitted with this equipment has been in operation since the beginning of 1922 in connection with the annealing of piano wire. It is reported that the cleanness of the gas has resulted in a substantial saving in oxidation losses, bringing them down from 1¼ per cent, as previously experienced, to about ¼ per cent.

Producers of this type and equipped with this method of control and agitation have been applied in open-hearth steel practice, in annealing and other similar furnaces in a large number of industries, and in the glass industry. They are made in several sizes as measured by diameters, including 6½ ft., 7 ft., 7½ ft., 8½ ft. and 10½ ft., and are reported capable of being heavily forced when large quantities of gas are required. Motors of 2 hp. and 3 hp. are used, the latter on the largest size only.

New Chronograph for Plotting Cooling Curves

Points at which critical transformations occur in cooling metals can be found by plotting cooling curves of the metals, the coordinates being temperature and time. This method is a valuable one in thermal analysis, and is known as the inverse rate method. This method has generally involved the plotting of cooling curves by hand, a laborious and time consuming process, except in one case in England where a recording chronograph was used. This instrument, however, is expensive, and the use of a single pen for recording time intervals continuously makes it necessary to employ a compensating device to take account of the time required for the pen to return to its "base position" or starting point.

In the plotting chronograph used at the Bureau of Standards, two pens are used, thereby obviating the necessity for providing such compensation. The apparatus was designed primarily for investigative work and has resulted in a saving in time in bureau tests of from 30 to 60 per cent over that formerly required, depending upon the temperature range over which determinations are desired. With slight modifications, however, it is well adapted for use in cases where very accurate and speedy determination of transformations in metals is desired. This instrument is described in Technological Paper No. 230 of the Bureau of Standards which can be obtained from the superintendent of documents, Government Printing Office, Washington, The price is 5 cents.

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ESTABLISHED 1855

THE IRON AGE

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Our Great Output of Steel

Information furnished last week by the American Iron and Steel Institute indicates that steel ingot production is now upward of 225,000 tons a month greater than in March and is running at an annual rate between 49,000,000 and 50,000,000 tons. The bearing of this unexpectedly large production upon the course of the steel trade in the remainder of this year may well be considered. The figures refer to ingots only. Steel castings are probably adding nearly 1,500,000 tons a year. In 1920 ingots were 40,881,000 tons; last year, about 34,500,000 tons.

The monthly ingot figures give the production of thirty steel companies, which contributed 84.03 per cent of the total ingot production in 1918, 85.12 per cent in 1919, 84.20 per cent in 1920, 87.50 per cent in 1921 and 84.13 per cent in 1922. This last percentage was reported only last week. The figures indicate that the 1921 percentage for the thirty reporting companies was exceptional, due to the preponderance of Steel Corporation output in that year. The corporation made no less than 57½ per cent of the total ingots in 1921 but only 46½ per cent in 1922. If ingot capacities are taken at 29,500,000 tons for the independents and 23,000,000 tons for the corporation, or a total of 52,500,000 tons, the corporation's percentage of capacity would be about 44. The tonnage figures are only approximate, but they are close enough for practical purposes.

Rates of ingot production appear to have been 46,500,000 tons a year in March and nearly 49,000,000 tons in April. THE IRON AGE blast furnace reports have shown successive gains in pig iron, March 1 to April 1 and then April 1 to May 1; hence it is reasonable to conclude that with the average rate of ingot production in April as it was, the present rate is between 49,000,000 and 50,000,000 tons a year.

This rate of output is much greater than was expected. The trade will readily recognize that in all probability the mills sold less steel for this quarter than they would have sold had they known what they would be able to make, also that buyers who overbought in anticipation that full deliveries would not be made are probably receiving more steel than they expected. Those who, unlike the financial writers who are referring to recent steel price advances as having curtailed steel demand, are familiar with the way things are done in steel, will recognize that the price advances have stimulated buyers to take heavy deliveries on old purchases at this time, because the steel was cheap relative to the present market.

The question now arises whether these unexpectedly heavy steel deliveries may not be in excess of the current consumption. Allowing for the reduced exports, the deliveries to domestic consumers are running about 75 per cent above the average rate in 1912 and 1913, the two greatest tonnage years before the war. The country may be anxious to have buildings, bridges, freight cars, machinery, agricultural implements, hardware, tools, and other things, at 75 per cent greater rate than in those years, but the question may be raised whether the builders and manufacturers, with the mechanical facilities and working forces they have, can effect the necessary conversion at 75 per cent greater rate than when our population was only about 10 per cent less than now and people were working pretty hard.

Postponement of Building

The postponement of many important building operations in different parts of the country, owing largely to the high level of wages, has caused a variety of comment. Labor union leaders do not like it and are protesting vigorously. In New York alone it is estimated that the postponements amount to $75,000,000, and the action of Columbia University, whose $10,000,000 building project has been indefinitely deferred, has become a subject of special consideration. Labor leaders declare that the action of the university is a mistaken one, which in the long run will defeat its own ends, at least as far as wages are concerned, because it is an attempt to keep down wages either by bluff or by the club of decreased employment. It is asserted that the suspension movement is one "hardly calculated to increase the spirit of cooperation among the workers."

This may be true; but the trouble is that co-

operation from workers, and particularly labor union leaders, has been lacking for a long time, and an attempt to create it by unlimited wage increases would be folly. It would mean in New York immediate surrender to painters demanding $10 per day and to plasterers on one very important building project who are demanding $14, with indications that their demand is a prelude of a general "snowballing" of wages of plasterers in the city until they may exceed $20, which is being paid in some centers.

If the increase of wages were at all in harmony with the increase in the cost of living, and if wages advanced uniformly in different trades, there would be less to complain of, but advances have come so rapidly, so irregularly, and often with so little to justify them, that contractors have been unable to form any definite idea as to what the cost of construction would be. The "snowballing" practice, by which wages are suddenly and repeatedly advanced while the building is under construction, prevented anything like completion according to estimates in many cases. Contractors have been compelled to submit to extortionate demands or permit work to stop entirely. In some cases, it is true, the workers in the building trades have rejected all control by labor union officials, but often advances have been demanded and strikes ordered in response to orders of the officials.

Unless there can be a reasonable increase in immigration or business depression sets in, the autocratic policy of unions in the building trades will probably continue. It seems certain, however, that the laying aside of building projects will also continue, unless wage earners are willing to enter into contract to work for a certain time for specified wages. If the unions would make a contract of this kind and guarantee it by a bond or other satisfactory assurance, the outlook for building could be greatly improved.

The Machine Tool Convention

The White Sulphur Springs meeting of the "makers of the master tools of industry," reported in this issue, showed unmistakably the sustained effort to improve the financial status of the industry through the closest study of the economic changes affecting its well-being. Artificial attempts to modify the law of supply and demand were not so much as considered. All that sort of thing has gone to the discard, along with the old-time indifference to the study of trade undercurrents.

As at the Lenox meeting last fall, attendance was limited to member companies. Apparently the idea was to secure an intensive study of broad business facts. There was no lack of appreciation of the importance of distribution and the distributer; but distribution questions were clearly subordinated for the time being to the main purpose of mutual education in the problems of manufacturers.

There has been some comment on the failure to include dealers in the plans for the convention, and on the temporary elimination of the selling problems of the business. In this connection stress is put on the advantages to maker and agent of gatherings in which both interests are recognized. There is reason for believing that all elements in the great machine tool industry will be cared for by some modification of the procedure followed in the last two builders' conventions. However, this is not likely to be realized until the manufacturers are satisfied that they have arrived at a proper balance of the various factors in their business.

Zirconium in Steel Metallurgy

During the war and later various claims have been made for zirconium and the unusual properties it confers on steel. Some of these were elusive or unsubstantiated. In the last two or three years elaborate investigation has uncovered some facts of first class importance. The first published account of the results appeared in these columns last week, as given at the annual meeting of electrochemists in New York, May 5. The investigators seem to have solved some of the earlier problems. In the first trials it seemed impossible to produce a uniform ferrozirconium. The development of a silicon-zirconium alloy for introducing the latter metal into the steel was the key to the later successes.

The action of zirconium on sulphur in steel is the most striking result. That it neutralizes the action of sulphur in producing red-shortness seems demonstrated. If ordinary carbon steel, of a sulphur content now considered abnormal and dangerous, can be easily rolled in the presence of the zirconium left after treating the steel, the commercial advantages are obvious. The vexatious sulphur problem is not only thus solved but raw material now considered unavailable is made valuable.

The scavenging effect of zirconium is also noteworthy. In fact it was as a scavenger that the alloy first attracted attention. Zirconium is found to exceed silicon in affinity for oxygen. Further, the alloying rôle of zirconium is exceptional. The investigators found that not only is ordinary carbon steel, after the zirconium treatment and addition, brought up to the level of some more complicated alloy steels, but also less of the more usual alloying metals is needed when the new metal is used. If this is substantiated by further use, zirconium will take its place among the most important of alloying metals. Other facts not yet made public emphasize this prediction.

These new developments recall the early announcements regarding titanium and then vanadium, both of which have come to be regarded as well-nigh indispensable in modern steel metallurgy. The story of zirconium suggests that other metals, now classed as very rare, may one day become familiar through the new possibilities they have opened up to the makers of steel.

A new use for chromium has been announced. Some details were published in THE IRON AGE last week, from a paper delivered before the convention of American electrochemists. The process involves the impregnation of iron with chromium

much as aluminum or zinc are caused to unite on the surface of iron in the familiar calorizing and sherardizing processes. "Chromizing" is not likely to find the wide use of the other two. It not only requires extremely careful handling as to temperature but it has two competitive products —chromium-plated metal and a special iron-chromium alloy, both recent developments. Electrolytic plating with chromium produces a non-corrosive surface, while the iron-chromium alloy is said to have unusual heat-resisting properties. Its conversion also into pipe and tubes by a special process will probably facilitate its commercial use. The efficacy of chromium in its ability to overcome rust and the destroying action of high temperature is being emphasized by each new development.

Interesting testimony regarding the production of steel without pig iron is contained in a communication to THE IRON AGE last week from Russia, commenting on an article in our issue of Sept. 7, 1922. It is to the effect that during the war steel was produced in Russia by the carbon and scrap process, using manganese, and that it was found to be equal in quality to steel made by regular processes, being used even for artillery purposes. While the process is not new, it has never been employed in the production of high-grade material on so large a scale as at present at the plant of an eastern Pennsylvania steel company. For some years there have been isolated cases where steel has been made without pig iron in Russia and Germany, as well as in the United States, particularly on the Pacific Coast; today this country undoubtedly leads in the employment of the process for the regular production of high test steel.

CORRESPONDENCE

Belted Group Drives Versus Direct Connected Motors

To the Editor: There appeared in a recent issue of THE IRON AGE an article published by an advocate of leather belting. This author dwells at length on the advantages of leather belt drives in preference to the electric motor drive. One of the statements made is that "there is no question that in many cases a motor drive means in the end additional complications and expense rather than simplicity and economy."

In answer to this statement, I might point out that, at a recent joint meeting of the A. S. M. E. and A. I. E. E. in Philadelphia, a paper was presented by George H. Benzon, Jr., design engineer William Sellers Co., Philadelphia, on "The Design and Construction of Large Machine Tools." In this paper Mr. Benzon points out that, "in the planing machine in particular the designers and builders have to thank the electrical engineers for the best solution so far, of the problem of reversing drive."

A reversing motor having direct connections to the driving gear of the planer has been developed in capacities up to 75 hp., and both it and the control have been found to stand up successfully under the strain of continuous reversal. The electric control of the variable speed d. c. motor has had considerable influence upon the design of machine tools in the last 25 years. The facility with which these can be changed within the range of the motor, in the case of a drive, and the ease with which one can use remote control on motors for the adjustment have eliminated many mechanical complications and made possible greatest simplicity of design. Mr. Benzon pointed out that it would have been practically impossible for the machine tool builders to develop reversing planers and other equipment of this type using shifting belt drives.

One might question the author of the paper which appeared in THE IRON AGE and ask how it would be possible to obtain the slow cutting speed and the high reversing speed on the planer with belt drive.

On the wood working molder or sticker an individual motor is placed on each cutter head and in addition a 4-speed motor is placed on the feed work. With the motor drive it is possible to operate any one head individually, allowing the others to remain idle. It is also possible in bringing the machine to a stop, to plug the motor and bring the motor to a quick stop. Another decided advantage is that, if the work becomes jammed in the machine, the cutter head will stop automatically, due to overload protection on the motor, which can be arranged so that any jamming or any trouble whatever on any one cutter head will immediately stop all cutter heads and the feed work at the same time. This is something that it is impossible to do with the belt-driven machine unless the belt slips off or breaks.

This again brings up the discussion of maintenance on belt-driven machines. To have the belt slip, due to the shocks on the machine, means that the tool or cutter head will slow up at the time when it is passing over a hard spot on the material, which is not desirable, whereas the electric motor will have a tendency to maintain practically a constant speed at all times and give the same finish over the whole length of material. This is also true in the metal machine tool industry. The same argument holds with this machine on a spindle shaper, hollow chisel mortiser, sanding machinery, etc.

No one can deny the fact that a piece of apparatus equipped with direct connected motors and control takes up less room than the belt-driven machine. But in one plant which recently has been changed over from belt driven to electric individual motor drive, there is one machine in particular that has increased the production of the operator probably 300 to 400 per cent, and in all probability could never have been built as a belt-driven machine. This, again, brings out the point that it is impossible to build and design a machine to accomplish the same result with a belt that can be accomplished with a direct connected motor drive.

It is not always the initial cost, the operating cost, the maintenance cost, or any other cost except the ultimate profit that goes into the owner's pocket that makes the machine desirable. No one will deny the fact that the belt-driven machine can be purchased at a lower cost than the direct connected motor drive. But the questions arise, Are the ultimate results the same? Is the cost of producing the article the same? Can it be accomplished in the same length of time? These are all questions which enter into the discussion. Each has to be handled on its own merits.

The belt advocate author points out in his article that "the motor must be of sufficient capacity to start the machine, as well as to keep it in operation after it is started, and it must have sufficient capacity also to be able to handle any overload which may be placed upon it. This requires that the motor shall be considerably larger than is necessary merely to drive the machine in operation." This statement is not correct, inasmuch as an electric motor has an inherent characteristic of being able to start loads of two to three times its normal operating capacity, so that a motor of sufficient capacity to drive the load under normal operating conditions is the correct motor to apply for this application. I have in mind an application where the proper motor is designed for the application and is belt connected to the machine. In starting up this machine the belt practically slips on every starting duty, whereas the motor comes up to speed very quickly and readily.

Another example of the failure of a belt upon which not unusual service was imposed was on an oil

well drilling and pumping outfit. The operator had applied practically every belt that was on the market. These belts were not applied directly by him, but at the suggestion of the manufacturers of the belting. The final result was that the operator connected a motor and gear directly to the equipment. This outfit has now been in service for practically a year, whereas the belts at the longest were in service for only three to four weeks.

The belt advocate author also points out that "a motor is a delicate piece of machinery, which must have constant care to keep it clean and in adjustment. Brushes and commutators wear and need frequent renewals, and not infrequently an accident will throw upon the motor a load greater than it can handle and a burnt out armature results." Every one appreciates that the above statement is not correct and that an electric motor, irrespective of whether it is direct current or alternating current, is not a delicate piece of machinery. I might state, however, that if the motors would get some attention their life would be practically indefinite. It is only due to the fact that the motor does not get the proper attention, that allows the bearings in the motors to wear, the commutator to wear, etc., that we have accidents on the electrical equipment. In the alternating current motor, especially the squirrel cage type, the only thing that needs any attention is to see that the bearings are properly lubricated.

Apparently there is a demand for direct connected motor driven equipment or the machine tool builders would not be changing their designs and building their machines with direct connected motors. The designer of the machine tool appreciates the advantages to be gained by using electric drive, over the belt-driven equipment. This is due not entirely to the efforts of the electrical manufacturing company to sell the electrical equipment, but in majority of cases to the machine tool builder and the ultimate user, who appreciate the advantage gained by the use of the electrical equipment.

There will always be a field for belt-driven equipment and it has its decided advantages; however, it suffices to say that the electric motor for direct connecting to the machine has been proved satisfactorily. It has shown a decided advantage over the belt-driven equipment and its use and application will continue to grow as it lends itself readily to the development of many types of new machine tool design.

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Grain Drills for South America

SPRINGFIELD, OHIO, May 14.—Orders for 1500 grain drills from South America have been received by the American Seeding Machine Co., insuring the steady operation of the plant with a good sized force. An additional order for grain drills is expected from the same territory; also from Russia. The orders from South America will require 125 cars to ship the machines to the seaboard.

The Standard Tank Car Co., Sharon, Pa., has received an order for 75 tank cars from the Mexican Petroleum Co. Fifty of the cars will be 10,000 gal. capacity each, and 25 will be 8000 gal. capacity. The company has orders on its books for building 1000 tank cars and 1500 box cars.

Stockholders of the Parish & Bingham Corporation, Cleveland, and the Detroit Pressed Steel Car Co., Detroit, have ratified the plan for consolidation, as announced in THE IRON AGE May 3, forming the Midland Steel Products Co.

Excavation work for tracks and foundations is now under way at Provo, Utah, where the Columbia Steel Corporation, San Francisco, is constructing a blast furnace and a by-product coke plant.

EXPORT MARKET INACTIVE

Chinese Refusal to Buy Wire Shorts Lowers Price —British Sheets Said to Be Better

NEW YORK, May 15.—With the exception of tin plate inquiries from the Japanese market, export business continues quiet. A fair amount of business continues to appear from South American buyers, but most of these orders are small. There is an increasing possibility of transactions with China on second-hand material, with the lower quotations now prevailing in the old material market. The continued refusal of Chinese merchants to pay the prices asked for wire shorts is evidently having its effect on prices of this material, which are reported by exporters to China to have declined by almost $10 per ton within the past week or two. A. R. Brown, McFarlane & Co., Ltd., 90 West Street, New York, is asking for prices on 600 tons of skelp for export.

In addition to a number of smaller inquiries for tin plate, recently reported, bids have been obtained by some Japanese export houses on an inquiry for 16,500 boxes of oil can size tin plate. There are still a few inquiries for heavy structural material and among Japanese inquiries for railroad material is a tender from Osaka municipality, bids on which were opened May 8, calling for about 1200 tons of high T girder rails, 87-lb. sections. The South Manchuria Railway Co. opened bids May 12 on 20,000 bolts and nuts for 100-lb. rails.

It is reported that a leading export interest, which has been out of the market on black sheets for export for several weeks, is again quoting but only on No. 26-gage and heavier. Inquiries for black sheets from Japan are still small, most of the current business in this product still being reported going to British mills. It is noteworthy that Japanese importers report improvement in the quality of British black sheets.

One pig iron importer in New York is offering small lots of Scotch foundry iron, No. 3, for June shipment, at $32 to $32.50 per ton, c.i.f., Boston, New York or Philadelphia, duty paid. French foundry iron has been offered at from $32 to $33 per ton, c.i.f., Boston, New York or Philadelphia. French sellers are said to be quoting 420 fr. per ton, f.o.b., Antwerp, which at the present exchange rate would make the price $27.72 per ton, to which must be added the cost of loading, insurance, freight and 75c. per ton duty.

COMING MEETINGS

May

National Association of Purchasing Agents. May 15-19. Annual convention, Cleveland, Ohio. H. R. Heydon, 19 Park Place, New York, secretary.

National Supply & Machinery Dealers' Association, Southern Supply & Machinery Dealers' Association and American Supply & Machinery Dealers' Association. May 17 to 19. Triple convention, Hotel Sinton, Cincinnati. F. D. Mitchell, 1819 Broadway, New York.

American Iron and Steel Institute. May 25. Hotel Commodore, New York, E. A. S. Clarke, 40 Rector Street, New York, secretary.

American Society of Mechanical Engineers. May 28 to 31. Spring meeting at Montreal, Quebec. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

June

Taylor Society. June 7, 8 and 9. Hotel Onondaga, Syracuse, N. Y. Dr. H. S. Person, managing director, 29 West Thirty-ninth Street, New York.

American Society for Steel Treating. June 14 and 15. Spring Sectional meeting, Hotel Bethlehem, Bethlehem, Pa. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

American Society for Testing Materials. June 25 to 29. Annual meeting, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. C. L. Warwick, 1315 Spruce Street, Philadelphia, secretary.

THIRD QUARTER PIG IRON

Strong Demand Indicated—The Price Situation as Affected by Lower Costs and Added Furnace Capacity

PHILADELPHIA, May 14.—Despite the present weakness of pig iron, particularly foundry grades, the producers of merchant iron are looking forward to a good buying movement soon for third quarter, and they base their expectations largely on the statistical position of the market. Interviews have developed interesting comment from the sellers' standpoint, the substance of which is given in what follows.

Although the output of merchant iron, as reflected by April blast furnace figures, is extremely high, being at the rate of about 10,300,000 tons a year, this is not excessive for years of outstanding industrial activity, as for example 1920, when close to 10,500,000 tons of merchant iron was made and the peak of activity in that year came within the first nine months.

In April, 1922, which was a time of low industrial activity, the total production of all pig iron was 2,072,114 tons, of which the merchant furnaces produced only 364,212 tons. In April, 1923, the total production was 3,549,736 tons, of which 845,386 tons was iron produced for sale in the market. Last year at this time a substantial proportion of the output of some steel companies' furnaces was going into merchant consumption, whereas at the present time the steel companies are using the bulk of their own iron, are taking very little new business and in not a few instances are not finding it an easy matter to satisfy the demands of their own steel making departments and to ship iron on merchant orders at the same time.

During the first four months of 1923 the users of merchant iron not only have had the merchant furnaces to draw upon, but they have also been receiving iron from steel companies and also they have been consuming stocks of foreign iron which were imported heavily during the last three or four months of 1922 and the early part of 1923.

The demand of consumers for iron for their third quarter requirements must be met almost exclusively by the merchant furnaces, as the steel companies, judging from present indications, will not be active sellers; the continued large consumption of steel will require practically all that their own blast furnaces will turn out. Nor will the consumers have the benefit of supplies from abroad. Practically no more foreign iron is coming in and the present price situation both at home and abroad does not promise any further importations of sufficient volume to have any effect on the domestic market.

Therefore, with fairly large consumption of iron by foundries and by those steel companies which do not have their own blast furnaces, and with very little, if any, steel companies' iron and practically no foreign iron, the merchant producers argue that they must take care of pretty much all the third quarter demand and they believe that all the merchant iron produced will be readily absorbed if consumption is maintained at anywhere near its present rate.

As the volume of manufacturing work under contract seems likely to engage the capacity of shops well through the third quarter and possibly longer, the merchant producers of iron view with equanimity the present market weakness. The real test of the market is likely to come within the next 30 days, possibly sooner, as there has been very little third quarter iron bought and consumers who have work ahead for their shops doubtless will want to cover their requirements soon for that period.

Having thus stated the case from the pig iron producers' viewpoint, there remain some considerations that weigh in the other direction. Among these are notably the supply and cost of coke and the shortage of labor. The latter affects melters of iron more seriously than it does the producers because more labor is required in the processes of turning pig iron into its various products than is used at the blast furnace in making iron.

Costs as Affecting Prices

As to the coke situation, it has at the moment a more important bearing on the cost of making iron in the third quarter. Most of the furnaces now getting coke on contracts are paying $7 a ton at ovens, whereas coke for third quarter is freely offered at $6.50 and there are indications that the price will go still lower. Some furnacemen believe that they will be able to cover their requirements for third quarter at $6 and even $5.50. The latter price would make a saving of approximately $1.75 a ton in the cost of making iron, and while this is to a certain extent offset by a higher ore cost (on Lake Superior ore) of 50c. per ton of ore or $1 per ton of pig iron, there would still be a saving which might be reflected in pig iron prices.

As has often been said, however, it is not costs so much as the factors of supply and demand that make market prices, so prices might go higher or lower regardless of the new cost factors. Quite a number of furnaces have recently come into blast and more that are scheduled to go in soon will seek to participate in the business offered for third quarter, and as these furnaces obviously are in a less favorable position than those which now have full order books, they may be inclined to offer price concessions to procure the backlogs necessary for successful operation. The opinion of experienced pig iron traders is that there will be ample pig iron business for the third quarter of the year, but at slightly declining prices, probably $1 or $2 lower on the average than those now being quoted.

FRENCH MARKET DECLINES

Buyers Still Await Lower Prices—Blast Furnaces Stock Ruhr Coke for Future—Pig Iron Lower

PARIS, FRANCE, May 3.—In April, the Société des Cokes de Hauts-Fourneaux received about 100,000 tons of coke from the Ruhr, compared with total receipts of only 21,500 tons in March. A number of blast furnaces could, in consequence, have been blown in, but the Minister of Public Works has requested French metallurgists to stock one-third of the Ruhr coke until they have reserves of 250,000 tons. It is worthy of note that, at the present rate of shipment, coke stocks in the Ruhr will be entirely exhausted in about two months and future prospects are, to say the least, uncertain.

The American coke which recently arrived at Dunkirk was in the same condition as to high percentage of dust as the first shipments unloaded at Antwerp. However, it will be possible to utilize it mixed with other coke. It is reported that long-term contracts for American coke are now being considered in France. If so, measures will probably be taken toward diminishing the breakage. Prices of British coke have declined 5s. to 10s. per ton, c.i.f.

The coke production of the ovens attached to French collieries was 149,285 tons in March compared with 131,994 tons in January and 121,682 tons in February.

The amelioration of the coke supply, followed by a slow increase in production, has resulted in a decline in prices, accelerated by a diminishing demand. However, the situation is such and the price of coke still so high that inland consumers might be ill-advised in persisting too long in abstention from purchases. It is difficult to establish prices in such a falling market and the tonnages involved in transactions are generally small.

Pig Iron.—The French production in March was 316,146 tons of pig iron (70,917 tons of foundry iron) and 315,807 tons of steel. The present average price of chill-cast foundry pig iron No. 3 P. L. is 460 to 465 fr. ($30.36 to $30.69) at furnace but on a large order a price of 450 fr. ($29.70) could probably be obtained. These are domestic prices. For export about 420 fr. ($27.72) f.o.b. Antwerp is being quoted. Middlesborough foundry iron is offered at 475 fr. ($31.35) f.o.t. Le Tréport or Rouen. Hematite pig iron is worth 480

to 500 fr. ($31.68 to $33) at furnaces in the East, and 500 to 510 fr. ($33 to $33.66) in the North. British East Coast hematite, mixed numbers, is bringing 500 fr. ($33) per ton, f.o.t. Le Tréport or Rouen.

Ferroalloys.—The following prices, effective May 1, are delivered consuming works for 10 tons or more and f.o.t. producing works for smaller lots:

	Fr. Per Metric Ton	
Ferrosilicon, 45 per cent Si	1025	$67.65
Ferrochrome, 60 per cent Cr., 6 to 8 per cent C	1790	118.14
Ferrotungsten, 75 to 80 per cent, per kg. of contained tungsten	12 to 12.40	79c. to 82c.
Ferromolybdenum, 60 per cent; C, 2 to 4 per cent max., per kg. of contained molybdenum	50 to 52	$3.30 to $3.43
Silicomanganese, 10 to 12 per cent Si, 18 to 20 per cent Mn	800	$52.80

Semi-Finished Material.—Some material is again appearing in the market but few sales are reported. In the Meurthe-et-Moselle and Lorraine, the following prices, f.o.b. works, are being quoted on semi-finished basic steel, with open-hearth quality from 20 to 40 fr. per ton higher:

	Fr. Per Metric Ton	
Ingots	580 to 600	$38.28 to $39.60
Blooms	600 to 620	39.60 to 40.92
Billets	640 to 660	42.24 to 43.56

While the same prices prevail in the North of France on ingots and blooms, billets are higher, being quoted at 650 to 670 fr. ($42.90 to $44.22) per metric ton and sheet billets are 760 to 780 fr. per metric ton. Slightly lower prices are quoted for export, f.o.b. Antwerp, blooms being offered at 540 to 550 fr. ($35.64 to $36.30) and billets at 560 to 570 fr. ($36.96 to $37.62) per metric ton. These lower export prices are the result of agreement by works in the East and Lorraine to make sacrifices in price in an attempt to obtain export business.

Steel Products.—As a result of the systematic abstention from buying business is slack and prices exhibit a distinct tendency to decline. However, with coke at about 250 fr. per ton, a steel works operating at about one-third of its capacity encounters a loss by selling mild steel at 700 or 750 fr. per ton, when each ton involves 450 to 500 fr. worth of coke. Present prices at mills in the East and Lorraine are:

	Fr. Per Metric Ton
Beams, channels and angles	650 to 720
Bars	700 to 750
Hoops	900 to 950
Wire rods	840 to 870

Sheets.—In the East and Lorraine the following prices are quoted at mills:

	Fr. Per Metric Ton
Sheets:	
5 mm. and heavier	780 to 800
2 to 3 mm.	880 to 900
Light gage	1050 to 1100

Castings.—Activity is irregular; some foundries are busy, while others are offering concessions to obtain orders.

JAPANESE MARKET WEAKER

Wave of Speculation Induced by Ruhr Occupation Recedes—Reduction of Copper Tariff Urged

TOKIO, JAPAN, April 23.—In consequence of the occupation of the Ruhr, which resulted in some speculative buying, the iron and steel market in Japan improved and quotations for bars and plates were above 300 yen per ton some time ago. Recently, however, the British price was lowered and the Japanese market declined rapidly in sympathy. Bars and plates were reduced 20 to 30 yen per ton. It is reported that the Yawata steel works was quoting on inquiries for more than 1,000,000 tons of material recently, but inquiries have lately decreased to less than one-tenth of this tonnage and the stocks of the Government works, which had been entirely cleared, have increased to 60,000 tons. As a result the Yawata steel works is reported to be considering lower prices.

In Japan the use of aluminum has increased steadily. Imports in 1913 were only 300 tons, while during 10 months in 1921 the arrivals amounted to over 3500 tons. The c.i.f. price stood at 36.5 sen per lb. some time ago, but has lately risen to 40 sen per lb. As there are no large arrivals, a further increase is expected.

Shortage of French Nails

Prices of French nails, c.i.f. Japanese port, and also of the raw material have increased lately. With a scarcity of stocks and a general decrease in demand, quotations are up to 18 yen to 18.50 yen. Orders for foreign nails were placed in January, but no large shipments are espected before June or later. Active demand for nails begins this month as a rule, and stocks are decreasing rapidly. Wire for nails is now quoted as high as 185 yen for British and 184 yen for American material, while Japanese wire is as high as 210 yen. French nails of American origin are quoted at 16.70 yen c.i.f. Japan; of European origin at 16.20 yen.

Lower Copper Tariff Urged

There is movement on the part of consumers to have the Japanese tariff on copper lowered. It has been frequently pointed out that the effect of the high protective tariff of 7 yen per 100 kin has been to increase the price of Japanese copper to such an extent that the export market has been lost. Lately, the stiffening of the price in New York has resulted in greater firmness in the Japanese market, prices having risen from 54 yen to 55 yen per 100 kin. A further increase is expected by consumers and electrical manufacturers are particularly anxious to have the tariff reduced.

Since early in March, when 200 tons of copper were exported to Mukden, China, shipments of copper to the Chinese market from Japan have ceased. Lately there are inquiries for 400 or 500 tons for Shanghai and Hongkong, and 50 tons for Mukden. Copper exported to China in recent months was all for military use, but recent inquiries are for the mints.

NEW GERMAN PRICE INCREASES

Foundry Iron, Steel Ingots, Bars and Thin Sheets All Advance—Falling Exchange Rate More Than Counterbalances Rise

(By Radiogram)

BERLIN, GERMANY, May 14.—Foundry iron No. 1 has been advanced by the Pig Iron Association to 714,000m. per metric ton ($16.32 per gross ton, at 2.25c. per 1000m.), compared with 660,500m. ($23.48 at 3.5c. exchange) on April 30 and with 616,300m. ($29.74 at 4.75c.) on April 9.

Similar increases in the prices of steel products have been made by the Stahlbund. Steel ingots are now quoted at 899,000m. ($20.55), in place of the 728,000m. ($35.13) of April 16; steel bars are now 1,250,000m. (1.28c. per lb.), in place of 1,012,000m. (2.18c. per lb.); thin steel sheets have been advanced to 1,971,000m. (2.01c. per lb.), in place of 1,596,000m. (3.44c. per lb.) four weeks ago.

[It will be noted that the increases in quoted figures do not compensate for the intervening fall of more than 50 per cent in the exchange value of the mark.—EDITOR.]

Rivet Forge with One-Piece Hearth

A rivet forge, designated as the No. 210, having a one-piece hearth, intended to increase the durability of the machine, has been added to the line of the Buffalo Forge Co., Buffalo. The hearth is formed with rounded corners and a rolled top edge for resting tools.

The hearth in previous types of rivet forges has been made in two pieces, the top and sides joined by a rolled seam. Moisture gathering in this joint tended to cause deterioration there. The new forge is equipped with the company's No. 200 blower, ball bearings and cut gears running in oil.

SHEET STEEL WAREHOUSE

Economy in Handling Material the Aim in New Cleveland Plant

IN designing a sheet steel warehouse for handling and stocking material in large quantities, probably the most important factor to be considered is the saving of labor in receiving and shipping out the various products. Labor saving was given a great deal of attention in the erection recently by the J. M. & L. A. Osborn Co., Cleveland, of a new warehouse, which is especially well arranged for the economical handling of sheet steel and sundry items. As about 60 tons of sheets and other products are being handled in the warehouse every day, and with the same outgoing tonnage, economy in handling has been the aim.

The warehouse is of steel and concrete construction, 185 x 335 ft., two stories, and providing 110,000 sq. ft. of floor space. The floors are all wood block laid on concrete. The first floor is used for store rooms and shipping departments, and the second floor for the manufacturing department and the storage of manufactured products. As it is more economical to handle material down than up, the receiving department is located on the second floor. This arrangement was not difficult, as the plant is located adjacent to Pennsylvania Railroad tracks that had been previously elevated, so that the car floor is about on a level with the upper floor of the warehouse. A switch track with a capacity of seven cars extends alongside the building. Four 8-ft. unloading doors are provided, so that four cars can be unloaded at a time. There is no unloading platform, cars being unloaded directly onto the warehouse floor.

Manufacturing Equipment on Second Floor

The second floor, on which are located presses and other forming equipment, is designed for carrying a load of 600 lb. per sq. ft. This floor is supported by concrete pillars, 18 in. in diameter, located on 20 ft. centers each way. The first floor is 17 ft. 6 in. in height and the second is about 14 ft. in height.

Incoming material is handled from the second floor to the first floor on a 10-ton, 10 x 20 ft. elevator, and there are two other elevators, each 6 x 12 ft. of 5 tons capacity for general purposes, including handling from the first floor for outgoing shipments. With separate elevators and four doors connecting the upper floor to the switch track shipping does not interfere with receiving.

Sheets are piled in two rows in the 20-ft. sections provided by the building columns, there being ample space in each section for two rows of sheets 8 ft. in length piled crossways. Three aisles run the length of the building, one in the center and the other two near the outer walls, and the crossways are 6-ft. aisles adjoining each two piles of stock. Consequently each pile adjoins an aisle on one side, which makes it convenient for handling the sheets to and from a pile with a truck without dragging the material. Handling is done by trucks hauled by a 7½-ton storage battery tractor. At one end of the building is a loading platform, which permits all truck loading under cover. This platform, which is 42 in. above the roadway, has a capacity for eight trucks.

Material Is Unloaded Directly from Cars to the Second Floor of the New Osborn Warehouse in Cleveland. The manufacturing department (lower left) is also on the second floor and the sheet metal stock is carried on the first floor (lower right), to which it is conveyed from the second floor by elevators

Mezzanine Floor Affords Storage Space

Suspended from the first floor ceiling is a mezzanine floor, 24 ft. wide, and extending the length of the building. This is inclosed with a wire screen on each side and permits the utilization of considerable space for storage of fabricating material, including furnace pipe, elbows and fittings, wash boilers and garbage cans. Inserts are provided in various bays, so that additional mezzanine floor space can be added. Continuous windows set in steel sash are provided on all sides, so that the interior is well lighted.

The company has just completed a new one-story building, 110 x 132 ft., for its offices and sales room, and moved May 5 to its new quarters, which are located at 1541 East Thirty-eighth Street, adjoining the warehouse.

The business now conducted by J. M. & L. A. Os-

born Co. was started in 1859 by Meyers, Osborn & Co., who engaged in the manufacture of stoves. On the retirement of Mr. Meyers in 1888 the foundry business was discontinued, and Mr. Osborn formed a partnership with his son, L. A. Osborn, and under the name of J. M. & L. A. Osborn, started a jobbing business. In 1902 the company was incorporated under its present name, and since 1904 its jobbing business has been limited to sheet metal and furnaceman's supplies. In 1908 a manufacturing department was established for making eaves trough, conductor pipe, etc. In 1920 the capital stock was increased to $1,000,000.

Plans of New Companies

The Walsh & McGee Steel Co., 2 Rector Street, New York, recently organized to manufacture bars, channels and angles, now has a rolling mill under construction at Newark Bay, Newark, N. J. M. Hoglan Co., Rockaway, N. J., has charge of construction. The furnace will be furnished by Tate, Jones & Co., Pittsburgh. Motors have been placed with the Crocker, Wheeler Co. The mill will be electrically driven and the furnaces will be oil burning. Initial capacity is estimated at 400 tons per month, and it is expected that operation will begin July 1. In a few weeks the company will be in the market for additional small motors, switch panel and accessories. Chief products will consist of bars, ½ in. and under; channels, 2 in. and under, and angles, 1½ in. and under. H. McGeé, president of the new company, was formerly vice-president of the Concrete Steel Co., 42 Broadway, New York.

The Electric Magnetic Loom Corporation, 320 Broadway, New York, recently incorporated with capital stock of $100,000 to manufacture looms and other textile machinery, will complete experimentation on its principal machine, one of distinctly new design, by next week. This finished, the company will take up plans for manufacturing regarding which nothing has yet been decided. A. C. Lordly heads the company. It is likely that work will be let out to contract.

The Tileflo Mfg. Co., New York, has been incorporated with capital stock of $100,000, having taken over a business in the manufacture of tiles and kindred products which the new company will continue. The incorporators are B. R. Riggs, J. and E. Preiss. Address care of E Klein, 2819 Broadway

The Standard Aeroplane Co., 557 Chestnut Street, Meadville, Pa., has been organized to manufacture helicopter aeroplanes. Plans for factory construction have been completely revised, hence this work will not begin for a few months. Charles L. Sanford is president.

John F. Humburg, president California Copper Corporation and vice-president of the Engles Copper Mining Co., is the head of a syndicate which it is understood has underwritten to the extent of $4,000,000 a Portland cement project said to be the largest of the Pacific Coast. The quarry is in the heart of the San Joaquin Valley.

The Electroducer Corporation, care of Earle A. Merrill, 763 Broad Street, Newark, N. J., has been incorporated to manufacture electric heating equipment. Nothing further has been done to date, but it is the purpose of the company to develop appliances for electric heating under the patents of Electroducer, Ltd., an English corporation.

The Gaylord Mfg. Co., 36 Morton Street, Paterson, N. J., has been incorporated with capital stock of $50,000, and will manufacture water saving devices and plumbing supplies. Offices are being completed in the Hamilton-Smith Building. Until a desirable site is obtained, all manufacturing will be done by contract, awards for which have been placed. Machinery has been purchased, but within a few months considerably more will be needed to operate an up-to-date plant which is now being planned. Leo J. Schlitzer is secretary.

The Aluminum Index Co., Edgewater, N. J., has been organized with capital stock of $100,000, as a subsidiary of the Aluminum Co. of America. For the present it will operate in a portion of the parent company's plant in Edgewater. Robert B. McKee is president.

Judson & Purcell, 137 Main Street, East Aurora, N. Y., has been incorporated with capital stock of $25,000 to manufacture gas engines and parts, but for the present will confine its activities to acting as manufacturers' representative.

The Turtle Bay Brace & Instrument Corporation, New York, has been incorporated with capital stock of $50,000 to manufacture surgical instruments and appliances. It is hoped to get under way as soon as possible, but the method of manufacturing is as yet undetermined. Address care of L. D. Hall, 565 Fifth Avenue.

The Herschede Electrical Co., Provident Bank Building, Cincinnati, has been organized to manufacture electrical products. Its chief activities consist in electrical construction for industrial and large office buildings. Thomas Herschede heads the company.

The Ickes Motors Corporation, Johnstown, Pa., recently incorporated with capital stock of $250,000 to manufacture automobiles, will do its manufacturing under contract. With a few exceptions most of the work has been placed. The company expects to be in production some time in July. L. Chester Ickes is president.

The National Automobile Tag Co., Inc., Harrisburg, Ark., has been incorporated with capital stock of $1,000,000 to manufacture metal products. Manner of manufacturing has not as yet been decided, but no contracts have been let to date. L. T. Thorn is president; Thos. Flournoy, treasurer; D. W. Morrison, vice-president and engineer, and C R French, secretary

The T. L. Talbert Iron & Steel Co., Inc., Charlotte, N. C., recently incorporated to manufacture structural forgings and cast iron products, has placed a contract with the Truscon Steel Co. for the erection of a standard steel building, which will be used for fabrication and general shop work. T. L. Talbert is president and general manager; W. M. Hood, vice-president and sales manager, and E. C. Boyette, Jr., treasurer.

The Triplok Rim Co., 305-7 North Fifteenth Street, Philadelphia, has been organized to rebuild automobile rims with a new device. M. Brooke is secretary.

The New England Lime Co., Danbury, Conn., has been organized to manufacture lime products. It has works in Vermont, Massachusetts and Connecticut. Buildings are already erected and the company intends to do all of its work. C. E. Griffing is president; A. N. Griffing, vice-president; David Follett, secretary-treasurer.

New Essex Optical Machinery, manufacturer of optical machinery, including automatic edgers, surface grinders, drills, cutters, optical benches, etc., 42 Lawrence Street, Newark, N. J., which was recently organized, has a fully equipped plant and is now operating. The company buys casting stone and steel.

The Indiana Body Co., 615-21 South H Street, Richmond, Ind., has been organized to manufacture automobile bodies, both open and inclosed types. Manufacturing is to be done under contract. The company contemplates in the near future extensive factory improvements which will increase production considerably. Production is now under way on bodies built for the Pilot Motor Car Co. and the Haynes Automobile Co., Kokomo, Ind. C. A. Culbertson is president; G. O. Stuck, vice-president; C. O. Rose, secretary, and W. E. Kreidler, treasurer.

The Albert Pipe Supply Co., Berry and North Eighth Streets, Brooklyn, N. Y., has been incorporated with capital stock of $100,000 to manufacture supplies and parts for engines, boilers, etc. It is now established and ready for business at this address. The incorporators are: I., J., and G. Albert. Corporate representative, Abraham Wengrow, 116 Nassau Street, New York.

The Johnson Gas Saver & Carbon Eliminating Co., 240 Herkimer Street, Brooklyn, has been incorporated with capital stock of $100,000, and is taking over a business established for some time in the manufacture of gas-saving appliances for automotive service. The incorporators are: S. C. Gillam, E. and H. Johnson. Representative, J. E. Pidgeon, 4 Court Square, Brooklyn.

The Newport Structural Steel Corporation, 714-18 Stone Avenue, Brooklyn, N. Y., has been organized as dealer in structural steel and kindred products, catering principally to manufacturers. The organization was at one time connected with the Rockaway Steel Co.

The Storm Tite Weather Strip Co., 563 Rogers Avenue, Brooklyn, N. Y., has been incorporated with capital stock of $25,000 to manufacture metal weather strips. It is taking over a business established for several years in this line. The incorporators are: S. F., J. R., and L. J. Esposito.

The Everlite Battery Co., 50 Court Street, Brooklyn, N. Y., has been incorporated with capital stock of $60,000 and will manufacture a special make of electric batteries and equipment. It is now seeking to obtain a factory or to build somewhere in Brooklyn and hopes to be ready to go ahead with this work in about two months. The incorporators are: E. I. Rubenstein, H. Kurland and L. Linker.

The C. N. K. Transmission Corporation, care of Herman Knepper, 3124 Third Avenue, New York, has been incorporated with capital stock of $100,000 and will manufacture transmission devices and equipment. Present efforts are being devoted to matters of organization but the company expects eventually to have a plant in the vicinity of New York. The incorporators are: C. W. Newbury, G. A. Klimek and H. E. Christie.

Iron and Steel Markets

HIGH STEEL OUTPUT

Deliveries Easier and Signs of Scarcity Passing

Pig Iron Lower at Pittsburgh—Finished Steel Prices Little Changed

The unexpectedly high rate of steel production shown by the official statistics for April, and the indications that ingot output is now running 225,000 tons a month higher than in March have thrown further light on the relation of supply and demand in the steel trade. New buying is still on the restricted scale of recent weeks, and at the same time consumers with very rare exceptions are taking material as fast as the mills can ship it to them.

The week has brought no significant changes in the prices of finished steel products. With larger mill deliveries, consumers have better stocks and the signs of pressure and scarcity so common in March and early April have passed away. At the same time some independent steel companies are showing renewed interest in getting more tonnage on their books.

Third quarter contracting is not yet of large volume, apart from sheets and tin plates, though there are fair sales of bars at 2.40c. to 2.50c., the former price representing a concession of $2 a ton for some makers.

Chicago, which has long been having the heaviest forward bookings, now reports that railroad car buying and oil storage tank orders have fallen off sharply. As is well known, car works are filled up for months. This accounts for the placing in the week of only 11 locomotives, 75 freight cars and 72 passenger cars, with new inquiry for less than 300 freight cars.

Pending rail inquiries amount to 300,000 tons and the Southern Railway has bought 30,000 tons.

Three-fourths of the 12,000 tons of fabricated steel lettings (against 13,000 tons in the previous week) were for private enterprises, while of the 16,700 tons of fresh inquiries 12,200 tons were for subways in New York and only 1200 tons for private work.

Automobile and parts manufacturers, while still operating at the high rate of recent weeks, are following a cautious policy and have not bought as yet for the third quarter, though several inquiries have been made for automobile body sheets for that delivery.

In the wire trade manufacturing buyers are putting new orders on mill books as fast as they get shipments, but demand for fencing as well as for mesh for new construction and for road building, has fallen off.

In the Pittsburgh district, prices of Bessemer, foundry and malleable grades of pig iron have declined $1 and basic $3 per ton. In other centers prices are fairly well maintained, but with reports of concessions accompanied by explanations which indicate a tendency toward weakness. Foundries, however, as a rule, are operating as fully as labor conditions will permit and deliveries are going forward freely.

The outlook is that the contract price for furnace coke for the last half of the year will be about $6. The export movement has ended for the present and coke on cars at Philadelphia, intended for export, has been offered as low as $3.25, ovens.

To Western Australia the United States will supply 8,000 tons of pipe plates, partly because the mills are able to cut exact sizes.

British iron and steel exports in April amounted to 386,957 tons, or only 5 per cent more than in January, showing less gain from the Ruhr deadlock than had been expected.

The Belgian rail strike is holding back deliveries. At Liège and Charleroi the lines to Antwerp are clogged with trainloads of iron and steel for export.

THE IRON AGE finished steel composite price remains at 2.789c. per lb., as last week. This represents a recession of 79c per gross ton from the peak of the present movement, reached in the fourth week of April.

Due to declines at Pittsburgh, pig iron has dropped from $30.79, which has prevailed for four weeks, to $29.29 per gross ton, on the basis of THE IRON AGE composite price. It is still $5.66 above the $23.63 of a year ago.

Pittsburgh

Sharp Reductions in Pig Iron Prices—Heavy Specifying of Steel

PITTSBURGH, May 15.—Putting the pig iron market to levels more in consonance with the changes which have already taken place in steel, scrap and coke has been the chief feature of the local situation since a week ago. While activity is still absent in pig iron, producers have shown more desire for business and this has been attended by reductions of $1 a ton in Bessemer, foundry and malleable grades, while as compared with the prices a week ago basic iron is off $3 a ton. The decline in the latter grade is greater than in the others for the reason that there is even less demand for it than for the other kinds, and available supplies are burdensome in the case of at least two merchant producers.

The claim is made by some that orders and specifications for steel practically are even with completed orders and it is asserted that some early tonnage busi-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	May 15, 1923	May 8, 1923	Apr. 17, 1923	May 16, 1922
No. 2X, Philadelphia‡	$32.76	$32.76	$32.76	$26.26
No. 2 Valley furnace†	*30.00*	31.00	31.00	24.00
No. 2, Southern, Cin'ti†	31.05	31.05	31.05	22.00
No. 2 Birmingham, Ala.†	27.00	27.00	27.00	17.50
No. 2 foundry, Chicago*	32.00	32.00	32.00	23.00
Basic, del'd, eastern Pa.	30.25	30.25	30.25	23.50
Basic, Valley furnace	*28.00*	31.00	31.00	25.00
Valley Bessemer, del. P'gh	*31.77*	32.77	32.77	26.96
Malleable, Chicago*	32.00	32.00	32.00	23.00
Malleable, Valley	*30.00*	31.00	31.00	24.50
Gray forge, Pittsburgh	*31.27*	32.27	32.27	25.46
L. S. charcoal Chicago	36.65	36.65	36.65	28.00
Ferromanganese furnace	130.00	130.00	125.00	65.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails heavy at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	45.00	45.00	45.00	35.00
O.-h. billets, Pittsburgh	45.00	45.00	45.00	35.00
O.-h. sheet bars, P'gh	45.00	45.00	47.50	35.00
Forging billets, base, P'gh.	55.00	55.00	52.00	37.00
O.-h. billets, Phila.	50.17	50.17	50.17	38.74
Wire rods, Pittsburgh	51.00	51.00	50.00	38.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	*2.45*	2.50	2.35	1.60
Light rails at mill	2.25	2.25	2.25	1.50

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.825	2.825	2.825	1.96
Iron bars, Chicago	2.60	2.60	2.60	1.65
Steel bars, Pittsburgh	2.40	2.40	2.50	1.60
Steel bars, Chicago	2.69	2.69	2.84	1.65
Steel bars, New York	2.74	2.74	2.84	1.88
Tank plates, Pittsburgh	2.50	2.50	2.50	1.60
Tank plates, Chicago	2.84	2.84	2.84	1.65
Tank plates, New York	2.84	2.84	2.84	1.98
Beams, Pittsburgh	2.50	2.50	2.50	1.60
Beams, Chicago	2.84	2.84	2.84	1.65
Beams, New York	2.84	2.84	2.84	1.98
Steel hoops, Pittsburgh	3.30	3.30	3.30	2.25

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	May 15, 1923 Cents	May 8, 1923 Cents	Apr. 17, 1923 Cents	May 16, 1922 Cents
Sheets, black, No. 28, P'gh.	3.85	3.85	4.00	3.15
Sheets, galv., No. 28, P'gh.	5.25	5.25	5.25	4.15
Sheets, blue an'l'd, 9 & 10	3.25	3.25	3.25	2.40
Wire nails, Pittsburgh	3.00	3.00	2.90	2.40
Plain wire, Pittsburgh	2.75	2.75	2.65	2.25
Barbed wire, galv., P'gh.	3.80	3.80	3.70	3.05
Tin plate, 100-lb. box, Pgh.	*$5.50*	$6.00	$6.00	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$23.00*	$26.00	$27.50	$18.50
Carwheels, Philadelphia	*24.00*	25.00	26.00	17.00
Heavy steel scrap, P'gh	*23.00*	23.50	25.50	17.00
Heavy steel scrap, Phila.	*19.00*	20.00	23.00	14.75
Heavy steel scrap, Ch'go	*19.00*	20.00	22.00	15.00
No. 1 cast, Pittsburgh	*26.50*	27.00	28.00	18.50
No. 1 cast, Philadelphia	*24.00*	25.00	26.00	18.50
No. 1 cast, Ch'go (net ton)	*22.50*	24.00	25.50	16.25
No. 1 RR. wrot. Phila.	*24.00*	25.00	28.00	17.00
No. 1 RR. wrot. Ch'go (net)	*17.00*	18.50	20.50	13.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$5.00	$5.00	$6.00	$6.00
Foundry coke, prompt	6.00	6.00	7.00	6.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*16.25*	16.75	17.25	13.25
Electrolytic copper, refinery	*15.50*	16.25	16.75	13.00
Zinc, St. Louis	6.60	7.07½	7.35	5.12½
Zinc, New York	6.95	7.42½	7.70	5.47½
Lead, St. Louis	6.90	7.20	8.15	5.20
Lead, New York	7.25	7.50	8.25	5.40
Tin (Straits), New York	*41.75*	43.62½	45.30	30.75
Antimony (Asiatic), N. Y.	7.25	7.62½	8.25	5.37½

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, May 15, 1923, Finished Steel, 2.789c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

May 8, 1923.	2.789c.
April 17, 1923.	2.810c.
May 16, 1922.	2.127c.
10-year pre-war average.	1.689c.

Composite Price, May 15, 1923, Pig Iron, $29.29 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

May 8, 1923.	$30.79
April 17, 1923.	30.79
May 16, 1922.	23.63
10-year pre-war average.	15.72

ness is being turned down. In spite of such statements, however, it cannot be very well disputed that the demand lacks the snap it had a few weeks ago and among the independent companies whose order books are not as heavy as those of the Steel Corporation, the disposition of buyers is to confine their purchases closer to actual requirements. Independent makers of sheets still are quoting galvanized and blue annealed sheets somewhat above the third quarter prices announced by the Steel Corporation, but on black sheets and all other finished products the prices observed by the corporation are also quoted by independent companies. A steel company which hitherto has been quoting bars at 2.50c., base, now is said to be open for business at 2.40c. With mills in this and nearby districts 2.40c. is now the top and bottom of the market on merchant bars.

The persistent decline in crude oil prices, although not yet effective in reducing the demand for oil country pipe, is looked upon as likely to affect business for delivery later in the year, especially as there is said to have been definite steps toward a curtailment of drilling operations in California and the Mid-Continent fields. There was another cut in Pennsylvania crude oil yesterday, bringing the base grade to $3.50 a barrel, representing a reduction of about $1 a barrel from the recent peak price. There continues to be considerable complaint about the shortage of labor, but so far as can be learned it is not affecting either the production of steel or pig iron, being more apparent in the finishing mills. In the absence of warm weather, blast furnace and steel works crews have been well maintained and the May production gives promise of being equal to that for April. Shipments of finished products are steady and evidence is lacking that any secondary manufactures or construction work are held up for want of steel. Semi-finished steel still is scarce for early delivery, but this situation gives promise of working easier with pig iron and scrap declining and finishing mill operations likely to ease down with the advent of warm weather. Continued indifference on the part of consumers, to say nothing of the weakness in the coke market and the probability of fuel supplies at lower prices for the third quarter than for the first and second quarters of the year, is beginning to tell on prices. There has been no real awakening of

interest in the market by melters, but producers have taken the first step in the direction of finding out where the real market is by definite offers of iron below the recent quotations. While most merchant producers still are talking $31, furnace, for No. 2 foundry, and have sold small lots at that figure, they do not deny that a bid of $30 would interest them and would take business in malleable at the same figure. Bessemer grade freely is offered at $30, and a few small sales have been made at that price. On basic iron, most furnace interests, in revising their prices, dropped to $29 as an asking price. In addition to tonnages from the furnace which sold a week ago at $28, one other producer has expressed a willingness to take business at that price. We note one sale of 2000 tons of high silicon basic iron at $29 and one of 1000 tons of standard basic at $29, both f.o.b. Valley furnace. Furnaces of the McKeefrey Iron Co., Leetonia, Ohio, and Struthers Furnace Co., Struthers, Ohio, will probably be blown in at the beginning of next week, and the Sharpsville furnace, Sharpesville, Pa., is expected to go in around June 1.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	$28.00 to $29.00
Bessemer	30.00
Gray forge	29.50 to 30.50
No. 2 foundry	30.00 to 31.00
No. 3 foundry	29.50 to 30.50
Malleable	30.00 to 31.00
Low phosphorus, copper free	36.00

Ferroalloys.—The market here is very quiet and prices in some cases are not as high as in some other markets. The highest price obtainable here on ferromanganese for early delivery is $130 and that for very small lots. This compares with reports of $135 for prompt tonnages in some other markets. For last half shipments the quotable market is $125 for either domestic or imported material, while on desirable business for fourth quarter delivery, it is believed that $122.50 can be done on the former. Interest in spiegeleisen and 50 per cent ferrosilicon in this territory is limited. Several inquiries lately have come from the West for prompt tonnages of ferromanganese, including one for 300 tons. The business is likely to go to a seller in a position to quote the material f.o.b. New Orleans. Prices will be found on page 1458.

Iron and Steel Bars.—Prices above 2.40c., base, Pittsburgh, for steel bars in the past week have become more of an asking than a selling base, and practically all makers now are quoting 2.40c., base. Some mills cannot make shipments in less than 60 days, but with deliveries on old orders on a liberal scale, demands for more prompt delivery are not especially numerous. Iron bars are holding at last week's prices.

We quote soft steel bars, rolled from billets at 2.40c. to 2.50c., base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. to 2.50c., base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Structural Material.—With investors showing a disposition to postpone new construction on account of high labor costs, awards are few and generally for small tonnages, and this situation is reflected in a demand for plain material. Mills still owe a good deal of steel on old orders, but with new business running behind completed orders, the quotations carry an assurance of earlier deliveries than the mills recently were promising. The market has settled pretty generally to 2.50c., and only small lots command more. Prices are given on page 1457.

Semi-Finished Steel.—Producers of billets, sheet bars and slabs, who have any tonnage to offer, still claim that it is not necessary to quote less than $45 to find an outlet for it. We note one fair-sized sale of sheet bars at $45, Pittsburgh. Forging billets still are quotable at $55 to $58, but sales above the lower figure refer to small lots, the tonnage market being quotable at $55. The skelp market appears to be slightly easier, in that there have been definite offerings lately by a Pittsburgh maker at 2.45c., as against 2.50c., recently asked. Offerings of rods have not increased sufficiently to bring about any easing in prices; the most recent sales by independent makers were at $55, base, and it is claimed that more could be sold at the same figure. Export inquiries carrying a price of $60, base, Pittsburgh, have been turned down because supplies are so limited. There is not the urgency to the demand for any form there was recently, but neither this development nor the weakness in scrap and pig iron has yet become a real price factor. Prices are given on page 1458.

Steel Rails.—New business in standard rails with the local producer is not especially heavy, consisting chiefly in orders from the smaller roads, who rarely anticipate their needs and the supplementary orders from the larger lines. Between the tonnage on order which cannot be produced between now and July 1, and business to come in meanwhile, it is expected the local producing unit will be well engaged over the remainder of the year. Light rails still are slow of sale and those rolled from old rails are being offered at slightly less than those rolled from billets or standard new rail crops. For several weeks both kinds have been at the same figure.

We quote 25 to 45-lb. sections, rolled from new steel, 2.25c. base; rolled from old rails, 2.15c. to 2.20c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Tubular Goods.—Buyers still are taking every foot of standard pipe that the mills are shipping, but there is not quite the snap to the demand for either this class or oil country goods there was recently. This is a perfectly natural development when it is considered that high labor costs are beginning to tell on building construction and the continued decline in crude oil prices is causing some revision of drilling programs. A number of line pipe projects are under consideration, but actual inquiries are not coming out because of the very deferred deliveries that the makers can promise. A local mill recently took 100 miles of 6-in. pipe for a line in the Middle West. Specifications are coming along well for wrought iron pipe, and buyers of boiler tubes still are insisting on shipments against their orders. There has been no let-down yet in the demand for seamless tubes from the automotive industry. Discounts are given on page 1457.

Bolts, Nuts and Rivets.—Specifications against old orders are reasonably heavy, but new business is moderate and the supply situation also is held by the fact that deliveries of steel are much freer than they were a few weeks ago. Nut steel is practically of the same analysis as screw stock steel, but there seems to be some doubt whether the extra applied to the latter recently will be exacted on nut bars. Prices and discounts are given on page 1457.

Track Fastenings.—Steady demand for small lots of spikes and bolts is supplementing specification on old orders and producers are doing enough business to be rather indifferent, but seeking to swell their bookings at the expense of prices. Prices are given on page 1457.

Cold-Finished Steel Bars and Shafting.—Buyers are specifying well against contracts and orders already in, but new buying is distinctly lighter than it has been, with the automotive industry showing up much less prominently than recently. That industry has been getting a liberal supply of steel for some time and is disposed to reduce inventories in shaping its schedules for a smaller production starting with June. We note no shading of the regular price of 3.25c., base, Pittsburgh, for drawn or rolled bars in carloads and 3.65c., base, f.o.b. mill for ground shafting.

Plates.—Few mills now are asking more than 2.50c., base, Pittsburgh, and higher quotations represent the ideas of mills which would have to absorb freight in shipping in the direction of Pittsburgh. Shipments against old orders are sufficiently heavy to relieve buyers, if the necessity of seeking supplementary tonnages for early delivery arises. Prices are given on page 1457.

Sheets.—Demand has lost its recent feverishness, but the mills have pretty heavy order books and since buyers are specifying well, the passing of extreme activity is without effect upon prices. Black sheets can

be bought for early delivery at 3.85c., save in cases where the specifications run too heavily to light gages. This price, which is the Steel Corporation figure, also is being observed by some of the independent mills on third quarter tonnages. A number of independent mills, however, are not yet ready to take on third quarter business, possibly because present bookings indicate that they will have little tonnage to sell for that period. Present orders of the independents are said to be sufficient to carry them half way through the third quarter at today's rate of operations and doubt is expressed that the present gait can be maintained when warm weather arrives. For early delivery, the market is quotable at 3.85c. to 4c., base, for black, 5.25c., base, for galvanized and 3.25c., base, for blue annealed. Some of the independent mills are quoting blue annealed sheets on a double base of 3c. for No. 12 gage and heavier and 3.25c. for No. 13 gage and lighter; this step is said to have been prompted more by fears of competition from plate makers than because profits are not possible. Independent mill operations still are well above 90 per cent, which is much above the rate of the leading interest which still is short of labor. Prices are given on page 1457.

Wire Products.—It is still observed that buyers are taking all tonnage due them on old orders and seeking to place with the mills larger specifications than the mills are willing to take. The policy of keeping regular customers protected, which means entering new orders merely to the extent of completed ones, still is being observed. There is no evidence yet, except in woven fence, that buyers have more tonnage on order than they think they will need. It is asserted that fence is too low in relation to other products and should advance, but there is no sign of a definite step in that direction yet. Prices are given on page 1457.

Tin Plate.—The independent market, at least so far as packers' cans are concerned, is down to $5.50 per base box, Pittsburgh. This was to be expected, since customers of the independents could not very well be placed at a price disadvantage with those of the Steel Corporation. It now seems likely that any advance over this price on general line tin plate that may be obtained by independents will be on business with buyers they are not obligated to serve. We now regard the regular market on production plate as $5.50, and note cancellations of some $6 business because buyers found themselves able to secure supplies at the lower figure.

Cold-Rolled Strips.—Outside of a few suspensions from the automotive industry, buyers are taking all tonnage due them, but new business is admitted to be lighter than it has been. A range of 5.25c. to 5.50c., base, Pittsburgh, still covers current business.

Hot-Rolled Flats.—There is no decline in specifications, but most makers admit that new business is in smaller volume than recently. Prices are holding at the recent range, since producers are not yet in need of orders to the extent they would take them at the expense of prices. Prices are given on page 1457.

Coke and Coal.—Producers of bee-hive oven coke who hitherto have had an idea that third quarter contracts for furnace fuel could be secured at $7 have considerably modified their price notions and while one interest is holding to $6.75 per net ton at oven, the more common asking price now is $6.50. Even that figure is well above the ideas of blast furnace interests which, in view of the weakening tendency in pig iron, regard $6 as their limit. A number of deals have been started this week and by next week the contract market should be clearly defined. One contract involving 12,000 tons a month for the third quarter has been negotiated by a Valley Furnace interest at $6 and it is claimed that the coke is one of the best brands produced in the Connellsville district. No third quarter or last half foundry coke contracts have been made. The spot market is still easy, and, while we note one sale of 1000 tons of furnace coke at $5.50, the real market on this grade ranges from $5 to $5.25 per net ton at oven. There are occasional sales of foundry coke at as high as $7.50 per net ton at ovens, but as a general proposition $7 is maximum and there have been sales all the way down to $6. Demand for coal has not improved sufficiently to bring about any strengthening of prices and we still quote the spot market at from $1.75 to $2.25 for mine run steam coal, and from $2.50 to $2.75 for mine run gas and coking coal.

Old Material.—The tendency of prices still is down, the most recent sales of heavy melting steel into consumptive channels, having been at $23, as against $23.50 to $24 a week ago. Supplies do not seem to be particularly large, but there is almost no buying except by one or two mills, which have been taking small lots. It is claimed that really good heavy melting steel cannot yet be had at less than $24, but mills that are exacting as to quality are not now in the market. Dealers claim to have bought this grade as low as $21.50 to $22. In practically all grades, quotations largely are nominal, since there is so little buying for consumption. A considerable short interest is said to exist here and tends to offset the effect of heavy railroad offerings on prices. The Norfolk & Western Railway will open bids May 16, on approximately 15,000 gross tons of scrap, the list showing very heavy offerings of old rails.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton

Heavy melting steel	$23.00
No. 1 cast, cupola size	$26.50 to 27.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; and Franklin, Pa.	23.50 to 24.00
Compressed sheet steel	22.50 to 23.00
Bundled sheet sides and ends	21.00 to 21.50
Railroad knuckles and couplers	25.50 to 26.00
Railroad coil and leaf springs	25.50 to 26.00
Low phosphorus standard bloom and billet ends	28.00 to 28.50
Low phosphorus, plates and other grades	26.50 to 27.00
Railroad malleable	24.50 to 25.00
Steel car axles	27.00 to 27.50
Cast iron wheels	24.50 to 25.00
Rolled steel wheels	25.50 to 26.00
Machine shop turnings	19.00 to 19.50
Heavy steel axle turnings	21.00 to 21.50
Short shoveling turnings	19.00 to 19.50
Cast iron borings	20.00 to 20.50
Heavy breakable cast	22.50 to 23.00
Stove plate	18.00 to 18.50
Sheet bar crop ends	27.00 to 27.50
No. 1 railroad wrought	19.00 to 19.50

Canadian Scrap Market-Duty Cut in Half

TORONTO, ONT., May 14.—Demand for iron and steel scrap by Canadian consumers has fallen off considerably during the past week or ten days. Steel mills and foundries are buying only in a small way and buying past second quarter is at a standstill. In the Montreal market business in iron and steel scrap is showing a weakening tendency. Consumers are buying in small tonnages against immediate needs, but future demands are small. Montreal prices, while unchanged for the week, are expected to show declines within the next week or two. In his budget which was tabled in the House of Commons on May 11, Hon. W. S. Fielding, Minister of Finance, has cut the Canadian import duty on scrap in half. Whereas the customs tariff on iron and steel scrap per ton was 50c. under the British preferential tariff, 90c. under the intermediate tariff and $1 under the general tariff, it is now 25c. under the British preferential tariff, 45c. under the intermediate tariff and 50c. under the general tariff.

Iron and steel scrap prices paid by dealers are as follows:

Dealers' Buying Prices—Gross Tons

	Toronto	Montreal
Steel turnings	$13.00	$14.00
Machine shop turnings	13.00	13.00
Wrought pipe	14.00	12.00
Rails	17.00	15.00
No. 1 wrought scrap	18.00	15.00
Heavy melting steel	16.00	17.00
Steel axles	18.00	18.00
Axles, wrought iron	21.00	24.00
Net Tons		
Standard car wheels	18.00	17.00
Malleable scrap	18.00	17.00
Stove plate	18.00	18.00
No. 1 machinery cast	22.00	24.00

Chicago

Checking of Buying Regarded Favorably—Excessive Wage Demands

CHICAGO, May 15.—Outside of rail inquiry, there are no prominent features in current steel demand and buying is at a much slower rate. The pause in activity is frankly welcomed by some producers who feel that business could not have kept up at the first quarter pace without bringing disastrous reaction. The note of caution sounded by leading financiers some weeks ago has had far reaching effects and while many buyers are now careful to the point of timidity, it is believed that the danger of a runaway market has been averted and that the present period of industrial activity has been thereby prolonged.

That consumption is heavy is indicated by the fact that pressure for deliveries is unrelaxed and that more steel is being put into use with every gain in mill production. Local mills have heavy forward commitments and are confident that buying on a broad scale will have to be resumed long before their present obligations have been discharged. It is true that railroad car buying and oil storage tank orders have fallen off sharply, but this is attributed mainly to the large forward bookings of builders. The current curtailment in new building construction work, however, may be more lasting because of the excessive wage demands of the skilled crafts. The rate of automobile production, on the other hand, shows no diminution. The leading local mill has made no change in its prices, which are confined to material for indefinite delivery. The Inland Steel Co. has not yet opened its books for third quarter, but its prices will undoubtedly be no lower than those of the foremost Chicago interest, particularly in view of the fact that it will have a considerable tonnage on its books overlapping from second quarter.

The principal response to the changed condition of the market has been by mills east of here. The so-called premiums have largely disappeared and, while prices on plates, shapes and bars at Pittsburgh are on about the same level as a week ago, mills show an increasing disposition to meet buyers halfway in arriving at a basis for doing business.

Steel output in the Chicago district is probably the heaviest in history. By putting in its last stack at Joliet, the Illinois Steel Co. now has all of its 27 steel works blast furnaces in operation, and has increased its steel output to 95 per cent of capacity. During the war period, steel production at times reached a higher percentage of rated capacity, but there has been an expansion in plant facilities since that time. The Inland Steel Co. is operating at 75 to 80 per cent of capacity, while smaller independents are running full or nearly so.

Ferroalloys.—Ferromanganese is being bought in good-sized lots for both prompt and second half shipment. A Chicago melter has closed for 250 tons for prompt delivery at $130, seaboard, while several carloads have been placed for second half at $125, seaboard. A sale of a carload of spiegeleisen for prompt shipment was closed at $58.58, delivered. There is no demand for spiegeleisen for second half, but it can probably be bought at a lower price for that delivery. A carload of 50 per cent ferrosilicon has been sold in this vicinity at $95 delivered.

We quote 80 per cent ferromanganese, $132.56 for second half delivery and $137.56 for prompt shipment; 50 per cent ferrosilicon, $95, delivered; spiegeleisen, 18 to 22 per cent, $58.58, delivered.

Pig Iron.—The market has shown some slight increase in activity, although still notably dull. There have been a fair number of spot sales of carload lots and interest is commencing to be manifested in third quarter iron, some sales for that delivery having been made. Inquiries are still few, however, and among the largest is one from a Chicago melter for 600 tons of foundry. Stocks in foundry yards are not great and for that reason sellers expect a buying movement to develop at any time. Melters are generally busy, although iron consumption is being held back somewhat by lack of labor. Notable among sales for nearby delivery was 300 tons of malleable for a Wisconsin melter. Prices are steady, although a relatively small tonnage of resale Northern No. 1 foundry was placed at 50c. less than the usual dollar differential above the base price. It is also reported that Southern foundry has been quoted at $26.50, base Birmingham, or 50c. under the market. Several carload sales of 8 per cent silvery have been made in Michigan at the full Jackson County schedule. Low phosphorus iron is not in demand.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.65
Northern coke, No. 1, sil. 2.25 to 2.75	33.00
Northern coke, foundry No. 2, sil. 1.75 to 2.25	32.00
Malleable, not over 2.25 sil	32.00
Basic	32.00
High phosphorus	32.00
Southern No. 2	33.01
Low phos., sil. 1 to 2 per cent, copper free (nominal)	$36.00 to 37.00
Silvery, sil. 8 per cent	44.29

Fluorspar.—A leading Illinois producer has advanced all grades of washed gravel fluorspar $2 a ton, bringing material with 80 per cent and over calcium fluoride and not over 5 per cent silicon up to $22, f.o.b. mines.

Rails and Track Supplies.—The railroads, which are estimated to be four years behind on improvements essential to the expeditious handling of their present traffic, have not been stampeded by the wave of caution which has passed over the steel market. In view of their improved earnings and their unremitting efforts to rehabilitate their properties during the past year, they are expected to continue to be heavy buyers of steel. At the moment their interest is focused on track work. During the past fortnight, rail inquiries aggregating more than 300,000 tons have come into the market. Most of this tonnage is for the Eastern portion of the country and is divided among five or six roads. As previously indicated, the requirements of the New York Central alone will amount to about 150,000 tons, while the Pennsylvania has put out an inquiry for 100,000 tons. The Southern has placed over 30,000 tons, largely with the Tennessee mill. There is also an active demand for spikes and bolts, angle bars and tie plates in fair-sized lots. Buying of rolled steel wheels has been particularly liberal. Light rails are quiet.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.80c. base and track bolts, 4.80c. base.

Plates.—Buying continues to decline, but there is no abatement in the pressure for deliveries and consumption continues to increase with each gain in mill output. Purchases of railroad cars and oil storage tanks are few, although one large tank award is reported. The Philips Petroleum Co. has placed with the Mount-Cooper Co., Tulsa, Okla., an order for tanks involving 6000 tons of plates, of which 2000 tons will be furnished by a Chicago mill. Tank plates continue to be quoted at 2.60c., Chicago mill, for indefinite delivery, although the leading independent remains out of the market, not having announced its third quarter price. Mills east of here are actively soliciting business in this territory, but it is doubtful whether they are booking much tonnage. The present curtailment in buying is sharper than had been generally anticipated, but local sentiment is nevertheless cheerful both because of the heavy forward commitments of Chicago mills and the belief that the danger of a runaway market with a consequent severe reaction has been averted.

The mill quotation is 2.60c., Chicago, for indefinite delivery and 2.84c. to 2.94c. delivered Chicago for specific shipment. Jobbers quote 3.30c. for plates out of stock.

Structural Material.—Fabricating awards and inquiries have fallen off sharply and this is no doubt due in large part to a change in the attitude of bankers

and investors toward further building construction at present costs. The pronounced scarcity of skilled mechanics has caused wages to rise so high as to discourage new projects and remote deliveries of steel from local sources have had a similar effect. Chicago mill prices on plain material remain unchanged, but producers east of here are showing increased interest in new business.

The mill quotation on plain material is 2.60c., Chicago, for indefinite delivery. We quote 2.84c. to 2.94c. delivered Chicago for plain material for specific shipment. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—Demand for soft steel bars is steadily growing easier and while the price situation is substantially unchanged, mills east of Chicago are more flexible in their ideas as to a satisfactory sales basis. Even the automobile industry, which is still operating full tilt, is reducing its buying program although still pressing for shipments. New commitments in bar iron also are on a reduced scale, but mills have considerable tonnage to work against as a result of the liberal buying in April. Specifications for rail steel bars are heavy, and new business is regarded as satisfactory although in smaller volume than heretofore.

Mill prices are: Mild steel bars, 2.50c., Chicago, for indefinite delivery and 2.69c. to 2.84c., delivered Chicago, for specific shipments; common bar iron, 2.60c., Chicago; rail steel, 2.30c. to 2.40c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.50c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3.15c. base; hoops, 4.55c.; bands, 3.95c.

Wire Products.—Demand has relaxed somewhat, but this is attributed to the approach of the summer season which is customarily a quiet period in the wire industry. The postponement of building work notable of late may also explain increased caution in buying for forward deliveries, but pressure for nail shipments is as insistent as ever, indicating heavy current consumption. Producers welcome the opportunity to reduce their heavy obligations and are not pressing for new business. Mill prices, which are now on a single level, are shown on page 1457.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, $3.95 per 100 lb.; cement coated nails, $3.40 per keg.

Cast Iron Pipe.—There is no alleviation in the shortage of 4-, 6- and 8-in. pipe, as demand is largely for these sizes. Prices are strong, but unchanged. Astoria, Ill., has placed 300 tons of 4- and 6-in. with the United States Cast Iron Pipe & Foundry Co., while the National Cast Iron Pipe Co. will furnish 150 tons for Coulter, Iowa. Pending business includes:

Michigan City, Ind., 150 tons of 6- and 12-in., bids taken May 14.

Monticello, Ind., 130 tons of 4- and 6-in., May 15.

Sidney, Ohio, 500 tons, May 18.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $64.20; 6-in. to 12-in., $60.20; above 12-in., $58.20 to $59.20; class A and gas pipe, $5 extra.

Bolts and Nuts.—There has been a slackening in demand from all quarters, including the automobile industry, which is still operating at a high rate. Orders and specifications from implement manufacturers are also lighter, but this is attributable to the seasonal character of the farm machinery trade. Spring tillage tools have been manufactured and shipped. Purchases of material for hay-cutting and grain-harvesting machinery have been completed and the next buying will be for fall requirements, i.e., for the production of manure spreaders and tillage tools. The March discounts on bolts and nuts are still adhered to.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.10c.; machine bolts up to ⅞ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, $2.50 off; blank nuts, $2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Reinforcing Bars.—Lettings have been heavy during the week and there is still much business pending. Considerable highway work is going ahead and the railroads are undertaking many improvements involving concrete bars. However, prospects for the further construction of apartment hotels, bachelor clubs and the like have been clouded by the steady increase in the cost of building labor and the difficulty in floating bonds for such projects. It is to be noted that this class of construction has accounted for a considerable portion of the concrete bar tonnage placed within recent months. Awards include:

Illinois State highway work, 400 tons to Kalman Steel Co.

Illinois Central Railroad, track elevation work, Champaign, Ill., 350 tons to Corrugated Bar Co.

Missouri State highway work, 350 tons to Kalman Steel Co.

Cement plant, Rapid City, S. D., 300 tons to Concrete Steel Co.

Oakland Motor Co., service station, Chicago, 250 tons to Kalman Steel Co.

Concrete sewer and sewage disposal plant, Paducah, Ky., 250 tons to Kalman Steel Co.

Wisconsin highway work, 200 tons to Concrete Steel Co.

Illinois highway work, 200 tons to Concrete Steel Co.

Union Stock Yards Co., hog pens, South St. Paul, Minn., 150 tons to Kalman Steel Co.

Claiborne Avenue wharf, New Orleans, 900 tons rerolled reinforcing bars to Laclede Steel Co., St. Louis.

Masonic Temple building, Madison, Wis., 100 tons to Kalman Steel Co.

Independent Casing Co. plant, Chicago, 100 tons to Barton Spiderweb System Co.

Rath Packing Co. plant, Waterloo, Iowa, 100 tons to Concrete Steel Co.

Pending work includes:

Lenox Club apartment hotel, Argyle Street and Winthrop Avenue, Chicago, 350 tons.

Sherwin Hotel, Chicago, 250 tons.

Racquet Club building, Schiller Avenue and Dearborn Street, Chicago, 200 tons; bids on general contract to be taken this week.

Covenant Club, Chicago, 100 tons.

Sheets.—Sheets are more generally available from independent sources at the prices recently announced by the Steel Corporation subsidiary, but some sales are still being made at higher quotations. It is evident, however, that mills are again seeking to build up their order books and an early return to a single price level would not be surprising.

Mill quotations are 3.85c. to 4c. for No. 28 black, 3c. to 3.25c. for No. 10 blue annealed and 5c. to 5.25c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Old Material.—Further declines in prices have only served to increase the caution of buyers and to stimulate offerings by sellers. Supply is steady being augmented by material from all the usual sources and railroad lists are notably liberal. Consumer buying meanwhile is at a low ebb. Rolling mills and foundries are making few purchases and low phosphorous grades are not much more active. A steel works has closed for about 2000 tons of heavy melting, but aside from this there has been no buying of basic open-hearth steel. In fact, by far the heaviest buyer of melting steel during the winter is now getting pig iron from all of its 27 blast furnaces and will therefore have less need for scrap.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$23.50 to $24.00
Cast iron car wheels	23.00 to 23.50
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	25.50 to 26.00
Rails for rolling	21.00 to 21.50
Steel rails, less than 3 ft.	22.50 to 23.00
Heavy melting steel	19.00 to 19.50
Frogs, switches and guards cut apart	19.00 to 19.50
Shoveling steel	18.75 to 19.25
Drop forge flashings	16.50 to 17.00
Hydraulic compressed sheets	18.00 to 18.50
Axle turnings	18.00 to 18.50
Per Net Ton	
Iron angle and splice bars	23.00 to 23.50
Steel angle bars	19.50 to 20.00
Iron arch bars and transoms	23.00 to 23.50
Iron car axles	28.50 to 29.00
Steel car axles	22.00 to 22.50
No. 1 busheling	17.00 to 17.50
No. 2 busheling	12.00 to 12.50
Cut forge	17.00 to 17.50
Pipes and flues	13.00 to 13.50
No. 1 railroad wrought	17.00 to 17.50
No. 2 railroad wrought	17.00 to 17.50
Steel knuckles and couplers	22.00 to 22.50
Coil springs	23.00 to 23.50
No. 1 machinery cast	22.50 to 23.00
No. 1 railroad cast	21.00 to 21.50
No. 1 agricultural cast	21.00 to 21.50
Low phos. punchings	19.00 to 19.50
Locomotive tires, smooth	19.50 to 20.00
Machine shop turnings	12.50 to 13.00
Cast borings	14.00 to 14.50
Short shoveling turnings	14.00 to 14.50
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Brake shoes	17.00 to 17.50
Railroad malleable	22.50 to 23.00
Agricultural malleable	21.50 to 22.00

New York

End of Export Movement in Coke for the Present—More Mills Quoting 2.40c. on Bars

NEW YORK, May 15.—The end of the exporting of coke to Europe is in sight. One vessel is now being loaded at Philadelphia and it is not expected that there will be any further movement for the present. This is due very largely to the decline in the price of British coke. The coal and coke markets are very soft and there is much uncertainty as to prices. It seems probable that the contract price for furnace coke for the last half of the year will be about $6, Connellsville ovens. For prompt delivery, furnace coke is quoted $5.50 to $5.75 and foundry, $6.50. By-product coke is quoted $12.31 to $12.34, Newark and Jersey City points.

Pig Iron.—Those who are taking an optimistic view of the pig iron situation are placing emphasis upon the heavy deliveries that are being made. One firm reports the heaviest deliveries last month that it has ever made and its deliveries this month are continuing at about the same rate. There are occasional requests for postponing shipments on account of the labor shortage, but that seems to be the only factor that is limiting production. The New Haven Railroad will lift embargoes on its lines May 19, but it is not believed the relief will last long. The only business of any consequence pending the past week was 1200 tons of No. 1 foundry iron for delivery the last half of the year to a Connecticut foundry. It is understood that a contract for 500 tons has been made with the remainder still pending. Prices as a rule are being well maintained, especially in eastern Pennsylvania. For Virginia iron the usual quotations are on a basis of $28.50 to $29 and on Buffalo iron $29 to $29.50. Iron is obtainable at some New York State furnaces at about $28.50, furnace. The foreign pig iron situation is being viewed with mild interest. Although numerous offers, particularly of French iron, are being made to sellers in the United States, the price is too high. Quotations are closely approaching the current domestic market. Foreign iron would have to be about $1 under the domestic market to interest the average consumer.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$35.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	34.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	33.27
Buffalo, sil. 1.75 to 2.25	$33.41 to 33.91
No. 2X Virginia, sil. 2.25 to 2.75	34.44 to 34.94
No. 2 Virginia, sil. 1.75 to 2.25	33.94 to 34.44

Ferroalloys.—Inquiry for ferromanganese is only moderate, the largest one noted being 350 tons for early delivery. Sales have been made of small lots at $130 to $135, seaboard or furnace, for prompt shipment and the alloy for contract is still available for shipment the latter part of the year at $125, seaboard. Imports in January, the latest statistics, were only 4215 gross tons, which is much lower than the average of over 7780 tons per month in 1922. The leading domestic producer of spiegeleisen has opened its books for the last half and has made fairly liberal sales of the 19 to 21 per cent alloy at $45 to $47.50, furnace. The market is only moderately active. Sales of small lots for spot shipment have been made at $50 and higher. The 50 per cent ferrosilicon market is only moderately active, at unchanged prices, and the same condition prevails in the ferrochromium market.

Cast-Iron Pipe.—Business continues fairly active and deliveries are still rather extended. Prices are firm. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $58.50; 4-in. and 5-in., $63; 3-in., $68.80, with $4 additional for Class A and gas pipe. The soil pipe market is slightly less active, but makers still have from 10 to 12 weeks work on hand. Part of the present inaction is attributed to improvement in railroad conditions, resulting in some slight increase in jobbers' stocks and also to the psychological effect of the recent suspensions in building operations. We quote discounts of both Southern and Northern makers, delivered New York, as follows: 2 to 6-in. standard, 13 to 15¾ per cent off list; heavy, 23 to 25¾ per cent off list.

Warehouse Business.—There is no evident diminishing of demand, which continues heavy for all kinds of material. Plates and structural material are particularly active. Although most of the warehouses in New York City handling cold-rolled shafting and screw stock have increased quotations to a basis of 4.65c. per lb. base, warehouses in Newark and vicinity are generally maintaining the previous price of 4.40c. per lb. base. Another slight advance in prices of steel pipe is expected before long. The sheet market is much quieter than for several weeks and neither black nor galvanized sheets are as strong as they were recently. Although a fair range of the market today is 5.10c. to 5.25c. per lb. base for black and 6.10c. to 6.25c. per lb. base for galvanized, shading is reported prevalent, particularly on orders delivered in the Metropolitan district and 5c. on black and 6c. per lb. on galvanized is often done. No change has been made on brass and copper products by warehouses in this district since March 29. We quote prices on page 1474.

Finished Iron and Steel.—Several large independents are now offering steel for third quarter at 2.40c. to 2.50c. for bars and 2.50c. for plates and shapes, Pittsburgh basing. Some consumers are willing to cover at these prices, but generally there is a spirit of hesitation which is more apparent as to plates, shapes and bars than it is to other steel products. Tin plate, for example, is in unusually strong demand, and a large independent, which opened its books for third quarter recently, had no difficulty in selling out its allotment for this territory and is now out of the market. Pipe is also very strong, and while the large tonnages are not being booked that were common earlier in the year, there is sufficient tonnage on mill books and in prospect to keep the pipe mills well engaged throughout the year, so far as present signs indicate the future. In structural steel there is a marked falling off both in projects awarded and in new projects coming out for bids. Most of the latter involve small tonnages. Publicity given recently to the postponement of millions of dollars worth of building work in New York because of high costs is not giving concern to fabricators and mills rolling structural shapes. Fabricating shops are filled up for two to five months and regard the postponement of new construction as a healthy sign, inasmuch as most of the delayed work will probably come out at a time when both mills and fabricators will be more in need of orders than is the case today. A revision of figures on structural steel lettings for buildings alone in the New York district for the first quarter of the year shows that the total was about 144,000 tons, instead of 126,000 tons, as at first computed by L. F. Caproni of the Hay Foundry & Iron Works. This is at a rate about 60 per cent above the normal requirements of 360,000 tons per year. The fabricating capacity available for New York has been estimated to be normally 600,000 tons per annum.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c. to 2.84c.; plates and structural shapes, 2.84c.; bar iron, 2.84c.

Old Material.—Weakness in practically all grades seems to still be the rule. With $19 per ton being paid on heavy melting steel of railroad quality, delivered to Bethlehem, a fair estimate of the current buying price is $16.50 to $17 per ton, with No. 1 heavy melting steel at $16 to $16.50, based on about $20 per ton delivered eastern Pennsylvania, and from $22 to $22.50 per ton western Pennsylvania. It is reported that about $18 would be paid for stove plate delivered to West Mahwah, N. J., and from $17 to $17.50 per ton to other foundries in New Jersey. As high as $18.75, delivered Phoenixville, has been paid and $18 delivered to a Bridgeport consumer is offered. The market on stove plate is quotable at $15 to $16 per ton, New York, but dealers report little material coming out at these prices. This decrease in the tonnage of material offered is evident in other grades. On specification pipe about

$17 per ton, delivered Lebanon, is offered. Forge fire is hardly to be quoted at more than $14.50 to $15 per ton, based on a recent sale to Parkesburg, W. Va., at $18.50 per ton.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$16.00 to $16.50
Steel rails, short lengths, or equivalent	16.50 to 17.00
Rails for rolling	19.00 to 20.00
Relaying rails, nominal	26.00 to 27.00
Steel car axles	24.00 to 25.00
Iron car axles	26.00 to 27.00
No. 1 railroad wrought	18.00 to 19.00
Wrought iron track	17.50 to 18.00
Forge fire	14.50 to 15.00
No. 1 yard wrought, long	18.00 to 18.50
Cast borings (clean)	14.50 to 15.00
Machine-shop turnings	14.50 to 15.00
Mixed borings and turnings	14.00 to 14.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	13.50 to 14.00
Stove plate	15.00 to 16.00
Locomotive grate bars	16.50 to 17.00
Malleable cast (railroad)	21.00 to 22.00
Cast-iron car wheels	22.00 to 23.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$22.00 to $23.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	21.00 to 22.00
No. 1 heavy cast, not cupola size	19.00 to 20.00
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

Cincinnati

Southern Ohio Pig Iron Declines—Coke and Scrap Prices Lower

CINCINNATI, May 15.—There is little activity in the iron market. A southern Ohio melter bought 600 tons of Northern iron and 250 tons of high sulphur Southern iron last week, the former at $30 and the latter at around $26.50, Birmingham, which, furnacemen hold, cannot be considered a cut in the market, as the iron was not of standard analysis. The southern Ohio market is softer, and $30, base, has been done on a few sales made last week, with one interest, however, reporting carload sales at $31. A few carload sales of Bessemer iron were reported at $30.50, and one lot of 200 tons of silvery went at the schedule. There is no demand for basic, which is nominally quoted at $30. Prices of Southern irons continue firm, occasional sales of carloads being the only activity. Inquiry is very light, only occasional requests for car lots for fill-in purposes coming out. A buying movement for third quarter iron is expected to develop shortly, as little contracting has yet been done for this delivery.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$31.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	31.55
Ohio silvery, 8 per cent	41.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	32.27
Basic Northern	32.27
Malleable	32.27

Finished Materials.—Buyers are pursuing a very cautious policy in respect to future orders, and as a result very little third quarter business has come out. There has been some contracting, however, on bars, shapes and plates, and while prices generally run 2.40c. for bars, and 2.50c. for shapes and plates, one independent mill, on business booked last week, received 2.50c. for bars, and is quoting 2.60c. on plates. On reinforcing bars, the market for reasonably early delivery, is generally quoted at 2.65c., but it is probable that 2.60c. can be done on tonnages. Some bar iron business has developed in this district within the past two weeks, and fair sales have been made. While there is little current demand for track fastenings, indications point to a brisk demand in the near future. Heavy sales made last fall were thought to have taken up all the business that would be placed for this year, but a number of railroads, which were heavy buyers at that time, and which specified delivery in first, second and third quarters, have already ordered their third quarter tonnages shipped. Wire nails are in big demand, and for early delivery $3.15 is being quoted by at least one mill. No new inquiries have come out for structural steel buildings, and no awards are reported. On the municipal stadium at Terre Haute, Ind., reported last week as requiring 150 tons of steel, the tonnage will run as high as 520, and in addition, over 1000 tons of reinforcing bars will be required. The North-Raffin Co., Terre Haute, is reported to be low bidder on this project, but as the bids exceeded the estimates, some changes will be made in the plans before the contract is awarded. No award has been made on the paper mill at Middletown, on which bids closed May 7. A nearby project is the 11-story Buckingham Hotel at Ashland, Ky., on which bids will shortly be taken.

Warehouse Business.—Local jobbers of iron and steel products continue to report heavy business, and orders, besides being more numerous, are for larger tonnages. Reinforcing bars and small angles are very active, with sheets also in heavy demand. Nails are reported to be scarce. No price changes have been made within the past week, but an advance on wire products is reported to be under consideration.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.60 per keg base.

Coke.—We note a sale of 25 cars of Connellsville furnace coke at around $5.25, ovens, and a furnace interest in southern Ohio is in the market for a small tonnage for filling in, the regular supply being hampered by car shortages. Some foundry orders were booked, but the tonnages were not large. The Connellsville market is lower, $5.25 being quoted on furnace and $6.50 to $7 on foundry. Prices from other producing districts remain unchanged from last week.

Old Material.—The scrap market is inactive, and prices are lower. A steel maker in the district bought heavy melting steel at $24, delivered, and is now offering $23 for June shipment, and getting takers. There is little demand for cast grades.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$15.50 to $16.00
Iron rails	18.00 to 18.50
Relaying rails, 50 lb. and up	29.50 to 30.00
Rails for rolling	20.50 to 21.00
Heavy melting steel	20.00 to 20.50
Steel rails for melting	17.50 to 18.00
Car wheels	19.00 to 19.50
Per Net Ton	
No. 1 railroad wrought	16.00 to 16.50
Cast borings	14.50 to 15.00
Steel turnings	13.50 to 14.00
Railroad cast	20.50 to 21.00
No. 1 machinery cast	23.50 to 24.00
Burnt scrap	15.00 to 15.50
Iron axles	26.00 to 26.50
Locomotive tires (smooth inside)	18.00 to 18.50
Pipes and flues	13.00 to 13.50

St. Louis

Neither Sellers Nor Buyers Active—Coke and Scrap Easier

ST. LOUIS, May 15.—The pig iron market is unusually quiet, with neither makers nor melters showing any anxiety to trade. Only two inquiries of consequence are before the market: A central Illinois melter wants 500 tons of foundry iron, 1.75 to 2.25 silicon, for May and June delivery, and 500 tons for third quarter, and a melter in the district is seeking 1000 tons of foundry iron, 2.25 to 2.75 silicon, for August, September and October delivery. The melt in the district continues heavy and buyers are insisting on prompt shipments against contracts and frequently anticipating schedules. Only small lots are being bought. The stove foundries here and in Belleville and Quincy are running strong.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$34.16
Northern malleable, sil. 1.75 to 2.25	34.16
Basic	34.16
Southern fdy., sil. 1.75 to 2.25	32.17

Finished Iron and Steel.—Fabricators continue to buy in lots of from 50 to 200 tons for special jobs, a business that is active. More inquiries are being received from jobbers, business in Memphis and Texas points being especially active. A St. Louis jobber

bought 1200 kegs of wire nails, approximately 60 tons. Several inquiries have been received from industrial concerns for wheels. The railroad trade is dull.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, cold rolled, one pass, 5c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, $\frac{7}{8}$ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, $2.50; and tapped, $2.50 off list.

Coke.—Connellsville and Wise County grades are plentiful in supply, with the market easy. Birmingham coke is difficult to get. There is no demand for domestic grades at present.

Old Material.—The market for old material is dull, with no buying in sight for at least six weeks. The mills are all well supplied with material, and will not buy until they need it. Offerings by the railroads continue large. The Frisco System has a list of 60 cars of yard scrap and 25 cars of scrap rails.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$20.00 to $20.50
Rails for rolling	20.75 to 21.25
Steel rails, less than 3 ft.	22.50 to 23.00
Relaying rails, standard section	37.50 to 39.00
Cast iron car wheels	25.00 to 25.50
Heavy melting steel	19.00 to 19.50
Heavy shoveling steel	18.00 to 18.50
Frogs, switches and guards cut apart	20.00 to 20.50
Per Net Ton	
Heavy axles and tire turnings	14.75 to 15.25
Steel angle bars	19.00 to 19.50
Iron car axles	27.00 to 27.50
Steel car axles	24.00 to 24.50
Wrought iron bars and transoms	24.00 to 24.50
No. 1 railroad wrought	18.50 to 19.00
No. 2 railroad wrought	18.50 to 19.00
Railroad springs	23.50 to 24.00
Steel couplers and knuckles	23.75 to 24.25
Cast iron borings	13.50 to 14.00
No. 1 busheling	17.50 to 18.00
No. 1 railroad cast	21.00 to 21.50
No. 1 machinery cast	22.00 to 22.50
Railroad malleable	20.75 to 21.25
Machine shop turnings	12.50 to 13.00

Birmingham

Profound Dullness of Pig Iron Continues—Coke Market Strong

BIRMINGHAM, ALA., May 15.—Sales of Birmingham pig iron have continued at a record low rate. Some makers barely scratched order books. Outside of one or two orders involving 200 to 300 tons for Chicago and Ohio delivery and similar tonnages for Southern consumption, the remainder was car lots and not very many of them. Frank H. Crockhard, president Woodward Iron Co., said last week that he did not expect real renewal of buying for several weeks. Inquiry among sanitary pipe producers evolved protection had been taken for a large part of the third quarter. The largest pressure pipe producer is known to have placed a very large tonnage through third quarter. Melters seem more and more at ease as to there being enough iron to go around this fall. The largest foundry maker is asking $28 for spot deliveries, the remainder $27. The $28 price is not significant. Iron is moving promptly from furnaces and this also tends to ease nerves of melters. Makers seem convinced that $27 will remain the minimum, but some are rather inclined to welcome a more brisk inquiry and would like to have soundings of the fourth quarter. Production will reach 250,000 to 260,000 tons this month. Sloss-Sheffield Steel & Iron Co.'s city furnace is momentarily expected to resume. The Alabama Co. lost temporary use of its Etowah ore mine by fire last week, but present supplies and proffers of supply by other makers will, it was stated, enable two furnaces to continue operations.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$27.00
Basic	26.00
Charcoal, warm blast	34.00

Finishing Mills.—The Nashville Bridge Co. has begun operation of its Birmingham plant with orders for tank plates and steel for barges for Government use on the Cumberland River. The Atlantic Coast Line awarded 450 gondolas to the Virginia Bridge & Iron Co. and the latter also has a bridge over the Tallapoosa River involving 475 tons. The Tennessee company's capacity production schedule continues and this is true of the independent mills. Bars are 2.70c., f.o.b. Birmingham.

Pressure Pipe.—The United States Cast Iron Pipe & Foundry Co. has taken 20,000 ft. of 8-in. and 12,000 ft. of 6-in. pipe for Miami Beach, Fla., De Lavaud pipe being specified. On some orders some concerns are charging more than the base of $49 for 6 in. and upward. Sanitary pipe remains quiet at base of $75 for standard.

Coal and Coke.—The coke market is very strong owing to furnaces taking such large quantities and the largest coke producer being out of the market. Makers get $10 as easily as $9 and $9.50, and it is not easy to get it even at $10. Coal production continues at the new high record of over 400,000 tons a week.

Old Material.—The scrap market is firm at the quoted prices, with a continuous large outgo of cast scrap. Smaller steel consumers are taking a large aggregate of No. 1 steel and paying the higher price.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Old steel rails	$18.00 to $20.00
No. 1 steel	16.00 to 18.00
No. 1 cast	24.00 to 25.00
Car wheels	24.00 to 25.00
Tramcar wheels	23.00 to 24.00
Stove plate	18.00 to 19.00
Cast iron borings	12.00 to 13.00
Machine shop turnings	12.00 to 13.00

Buffalo

Heavy Production of Pig Iron Continues with Few Sales

BUFFALO, May 15.—With production at its greatest peak in three years, blast furnaces are finding shipments greatly in excess of incoming orders. Two merchants found evidences of more interest in buying the latter days of last week, but the market is stagnant as a whole. Reports of a recession in the base price are more widely circulated, but none of the selling factors will confirm the report that $29 base has been quoted at Eastern points; all, however, have encountered the quotation in competitive instances. Twenty stacks out of 22 are now in full blast in the district. This production record has not been touched since 1920. Orders have not exceeded 100 tons and mostly call for carloads. The number of orders does not equal the number for the previous period. Evidence of the big production records is found in one furnace where 27,000 tons of basic and foundry iron was produced in April; the highest record for any month previously was 24,000. The large consumers do not expect that prices are going higher and are in no haste to buy.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$30.50
No. 2X foundry, 2.25 to 2.75 sil.	30.00
No. 2 plain, 1.75 to 2.25 sil.	29.50
Basic	30.00
Malleable	30.00
Lake Superior charcoal	37.28

Finished Iron and Steel.—Two factors which had been unable to meet calls for bars, shapes and plates are again taking tonnages; one for limited quantities from regular customers and the other—a mill, is taking tonnages in a freer way. Prices on bars, shapes, plates and sheets are on the same basis that has been maintained since the middle of April. Bars range from 2.40c. to 2.60c.; a local maker is quoting 2.50c. with delivery 60 to 90 days. Shapes and plates from 2.50c. to 2.60c. with two exceptions—mills not regularly active in this territory are promising reasonably early delivery at 2.70c. to 2.85c. The leading local mill is quoting 2.60c. on shapes and plates. Demand for wire and pipe shows no abatement, while for other products it is fairly lively but certainly not as insistent. The majority of sheet interests are quoting 3.85c. in keeping with the Steel Corporation schedule for black sheets, but two mills—one local—are asking 4c. Third and fourth

quarter inquiry on all products has developed in greater measure. Not any interest represented here is quoting for fourth quarter. Building operations are expected to slow up; labor demands have already discouraged several proposed enterprises where large shape requirements were involved. Shipments are greatly in excess of incoming business with sellers, but all factors have such encouraging backlogs there is no feeling of a general slump.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5.10c.; cold rolled round shafting, 4.45c.

Old Material.—Buying is even quieter than the previous week. Only one mill is even partially interested and will not pay more than $22 to $23 for heavy melting steel. Rejections continue heavy and the whole market for old material is dull.

Heavy melting steel	$22.50 to $23.50
Low phos., 0.04 and under	27.00 to 28.00
No. 1 railroad wrought	20.00 to 21.00
Car wheels	21.00 to 22.00
Machine shop turnings	17.00 to 18.00
Cast iron borings	19.50 to 20.50
No. 1 busheling	19.00 to 20.00
Stove plate	20.00 to 21.00
Grate bars	18.00 to 19.00
Bundled sheet stampings	16.00 to 17.00
No. 1 machinery cast	23.00 to 24.00
Hydraulic compressed	19.50 to 20.50
Railroad malleable	24.00 to 25.00

Cleveland

Slight Gain in Pig Iron Sales—Coke Weak—Scrap Again Marked Down

CLEVELAND, May 14.—Most consumers have purchased ore to cover their requirements for several months and no additional sales or inquiries are reported. A fair volume of additional buying is expected before the close of the summer. With the heavy pig iron production, ore sellers are now predicting that the season's movement will be 60,000,000 tons or more. A few weeks ago it was generally estimated that the season's shipments would amount to about 55,000,000 tons. Ice conditions are still interfering with lake transportation and it will probably be a week before ore is moving in good volume, consequently May shipments will be light. For ore prices, see page 1458.

Pig Iron.—Sales of 4,000 to 5,000 tons of foundry and malleable iron in three or four lots for the third quarter delivery were made during the week by one lake furnace, which is a gain in the amount of business that this producer booked over the previous week. This is the only activity reported in third quarter iron business in this territory and the market on a whole is about as dull as during the few previous weeks. Some demand has developed for small lots of foundry iron for early shipment. One producer sold 1,000 tons in small lots and another made a number of carload sales of Buffalo foundry iron to Cleveland consumers at $29.50, furnace. The third quarter business was booked at $31.50, which the seller has been quoting for some time, but the iron goes to points outside the zone affected by weak spots developed in the market recently. The Valley quotation is unchanged at $31, but no business has come out of sufficient size to test prices. The general feeling of consumers is that the market will settle down to somewhat lower levels for the third quarter and they seem in no hurry to buy. Some furnace companies have well filled order books for the third quarter, but others have booked very little tonnage. Shipping orders continue heavy.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$31.00
Northern No. 2 fdy., sil. 1.75 to 2.25	$32.15 to 32.77
Southern fdy., sil. 1.75 to 2.25	33.00
Malleable	32.15 to 32.77
Ohio silvery, 8 per cent	42.52
Standard low phos., Valley furnace	36.00

Bolts, Nuts and Rivets.—Bolt and nut makers are still getting a good volume of specifications, particularly from the railroads, but new business is light as most consumers are under contract. Rivet specifications are fair, but there is not much new business. Prices are firm at 2.25c. for structural and 2.35c. for boiler rivets.

Finished Material.—Mills in a position to take third quarter contracts booked a fair volume of business during the week, largely in steel bars, but the demand for material for more extended deliveries as well as for quick shipment showed a further slackening. Premium prices are disappearing. The steel consumption appears as heavy as ever, but with improved mill deliveries consumers have better stocks and are not crowding the mills for shipments. Both the automobile and parts manufacturers are following a cautious policy and are not yet buying for third quarter. Owing to improved mill deliveries, warehouse orders have declined sharply as compared with April. One independent producer booked 7500 tons of steel bars for the third quarter at 2.50c. and is making that price to consumers who recently made reservations for that delivery. Considerable of this business appears to have come from the bolt and nut manufacturers. Other mills are quoting steel bars at 2.40c. for the third quarter. There is a good demand from railroads for plates for car repair work, and plate deliveries are slowly easing up. However, a local mill is still taking orders for early shipment at 2.85c., Pittsburgh, and an Eastern mill at 2.80c. at mill. For the third quarter delivery, the ruling price is 2.50c. The structural situation is still quiet. Considerable construction work is being held up because of the high cost of building.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.75c.; No. 28 galvanized sheets, 5.90c.; No. 10 blue annealed sheets, 3.90c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Coke.—The market is weak and several makers have reduced prices on foundry coke 25c. a ton. We quote the better grades of standard Connellville foundry coke at $6.75 to $7.50, although other brands can be had at considerably lower prices. Activity is limited to carload sales.

Old Material.—Prices have continued their downward trend. There were sharp declines during the week on foundry scrap and further reductions on most other grades. There is virtually no buying by consumers. A small lot of heavy melting steel offered by the Nickel Plate Railroad last week brought only $21. Mills are still taking a large quantity of scrap on contracts placed at much higher than prevailing prices and dealers are crowding shipments so as to avoid any cancellation. In some cases material is coming in faster than it can be handled and mills are holding up deliveries. In the absence of a local demand, the bulk of the local scrap is being shipped to outside consumer points.

We quote per gross ton f.o.b. Cleveland as follows:

Heavy melting steel	$21.50 to $22.00
Rails for rolling	23.50 to 24.00
Rails under 3 ft.	23.50 to 23.75
Low phosphorus melting	24.00 to 24.75
Cast borings	17.25 to 17.50
Machine shop turnings	17.25 to 17.50
Mixed borings and short turnings	17.25 to 17.50
Compressed sheet steel	20.00 to 20.25
Railroad wrought	18.00 to 18.50
Railroad malleable	27.00 to 28.00
Light bundle sheet stampings	12.75 to 13.00
Steel axle turnings	18.00 to 18.50
No. 1 cast	24.50 to 25.00
No. 1 busheling	16.00 to 16.25
Drop forge flashings	18.75 to 19.00
Railroad grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Pipes and flues	13.00 to 13.50

Sheets.—Several of the automobile companies have sent out inquiries for automobile body sheets for the third quarter, but no sales are reported. Independent mills will probably adopt for this delivery the 5.35c. price, which was the basis of their second quarter sales and which is now quoted by the American Sheet & Tin

Plate Co. Local mill prices are getting nearer to the Steel Corporation prices, although on blue annealed sheets, which are scarce, 3.25c. is the more common quotation. A local mill has reduced its price from 3.40c. to 3.25c. On black sheets the 4c. price is disappearing, the common quotation being 3.85c., at which orders can be placed for quick shipment. Galvanized sheets are quoted at 5c.

Reinforcing Bars.—Bids for 1400 tons of reinforcing bars for work in connection with the Baldwin Reservoir, Cleveland, will be taken May 22 by the Stange & Walsh Construction Co. While the demand has slackened, road and school work aggregating several hundred tons is pending. Hard steel reinforcing bars are unchanged at 2.40c. to 2.50c.

Philadelphia

Steel Market Easier—Pig Iron Dull—Scrap Prices Continue to Decline

PHILADELPHIA, May 15.—Steel consumers are now so well covered for their immediate requirements that attention is centered on third quarter contracting, which has as yet attained no large volume except in sheets and tin plate and to a more moderate extent in steel bars. The mills of the United States Steel Corporation are, of course, well sold up and its subsidiary selling organizations are accepting practically no business with promise of definite delivery. However, some of the larger independents have shown within the past week marked indications of renewed interest in taking more tonnage, particularly in plates, shapes and bars. In plates there has been very active solicitation of consumers by one large independent interest, with prices as low as 2.60c. for prompt shipment and 2.50c. for third quarter. On bars and shapes 2.50c. is also readily available on third quarter business, with 2.40c. quoted by one independent and prospects that others may go to this price shortly. Eastern mills which have been taking most of the quick shipment business now find it less easy to obtain orders at the higher prices they have been quoting and these so-called premiums are gradually disappearing.

In pig iron extreme dullness prevails, the only promising development from the sellers' viewpoint being that a little inquiry for third quarter has come out. On the other hand, production of iron in the East is increasing, with more furnaces coming into blast. The scrap market continues dull, with further declines in prices.

Ore.—Each week brings a cargo or two of Swedish iron ore, the total for last week being 7961 tons. A cargo of 3015 tons of chrome ore from South Africa was also received here. Recent sales of Swedish ore have been at 11c. and 11.25c. per unit, Philadelphia.

Pig Iron.—The first inquiry of importance for third quarter iron has come from the Westinghouse plant at Essington, Pa., which wants 1200 tons of foundry and Bessemer grades. There is also an inquiry from the Taylor Wharton Iron & Steel Co. for 300 to 900 tons monthly of low phosphorus iron for third quarter shipment. Despite the absence of any buying worthy of note, the local pig iron trade continues to look forward confidently to a large third quarter buying movement soon and regards the aforementioned inquiries as the inception of such buying. The week's developments point to a further increase in pig iron production in the East. The Eastern Steel Co. has put the second Warwick furnace in blast, doubling its output, and the Dunbar furnace went in blast Monday. It will make foundry iron for a month and then turn over to spiegeleisen. The Lochiel furnace will be operated by Edward E. Marshall on basic iron, going in blast next week. It will convert the 40,000-ton ore pile of the Central Iron & Steel Co., Harrisburg, which has been carried since the war, into iron which is being offered for sale. The Temple furnace is also expected to be in blast shortly. New England railroad embargoes are expected to be lifted next week, permitting Eastern furnaces to ship some of the iron they have been piling in recent weeks. The most important iron sales of the past week were of foreign low phosphorus, a total of about 1000 tons having been disposed of at $35, Philadelphia, by one importer. Imports of foreign iron apparently have ceased, none having come in in two weeks.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$31.76 to $32.64
East. Pa. No. 2X, 2.25 to 2.75 sil.	32.76 to 33.64
East. Pa. No. 1X	33.76 to 34.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	34.17
Virginia No. 2X, 2.25 to 2.75 sil.	35.17
Basic delivered eastern Pa.	31.00 to 31.50
Gray forge	29.50 to 30.00
Malleable	33.14 to 33.64
Standard low phos. (f.o.b. furnace)	32.00 to 35.00
Copper bearing low phos. (f.o.b. furnace)	33.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.

Continental foundry, 1.80 to 2.50 sil.	$31.00
Continental foundry, 2.50 to 3 sil.	32.00
Low phos. copper free, guar. not over 0.035 per cent phos.	$35.00 to 36.00
Continental, phos. 1.50; sil. 2 to 3	31.50

Coke.—Standard Connellsville furnace coke for prompt shipment is available at $5.50, ovens, while some of the operators are willing now to make contracts for third quarter at $6. Distress coke, some of which is on cars at Philadelphia, whence it was to be shipped abroad, is offered at prices ranging from $3.25 to $3.75, Connellsville. Foundry coke for prompt shipment is quoted at $7 a ton, although this can be shaded in some instances.

Semi-Finished Steel.—Open-hearth rerolling billets are offered at $45 to $47 and forging billets at $55 to $57, Pittsburgh. Mills are not anxious for orders for forging billets owing to the shortage of chippers.

Plates.—Further signs of an easier situation in plates are at hand. The recent peak price of 2.75c., Pittsburgh, although still quoted by one or two mills, may be said to have practically disappeared, so far as its bearing on current business is concerned. For early delivery the range of prices on quantities ranging from a carload upward is 2.60c. to 2.65c., Pittsburgh, while for third quarter 2.50c., Pittsburgh, is quoted. It is possible to obtain deliveries in two to four weeks from one large Eastern mill. The Lukens Steel Co. is again increasing mill operations by running its large mill full time, and its output is as near 100 per cent as labor conditions will permit. The shortage of labor at Coatesville plate mills has been remedied to some extent by the importation of negro and Mexican laborers.

Structural Shapes.—There is very little buying of structural shapes, as new building projects are at a minimum and fabricators and jobbers are getting sufficient supplies on their second quarter contracts. For third quarter shipment, 2.50c., Pittsburgh, is quoted, while Eastern mills able to make shipment from early rollings still ask 2.75c., mill, but there is a diminishing volume of orders of an urgent character.

Bars.—It is probable that bars will be freely obtainable for third quarter at 2.40c., Pittsburgh, within a week. So far only the Carnegie Steel Co. and one large independent has quoted this price to consumers in this territory. In the case of the former producer, indefinite delivery is specified. Two other independent mills are today quoting 2.50c., Pittsburgh, for third quarter shipment. Bar iron is still quoted at 2.50c., Pittsburgh, but there is very little business.

Sheets.—Large consumers have now pretty well covered their needs for third quarter, and there is very little buying for earlier shipment. Deliveries on contracts from mills have been increasing of late, and some consumers have held up shipments rather than carry too much stock. When sheets are required for early delivery, the mills have very little trouble in obtaining $3 to $5 a ton above the third quarter prices

of the American Sheet & Tin Plate Co. and other large producers.

Warehouse Business.—Buying of steel out of stock continues at a high rate. One large Philadelphia jobber last week sold 12 per cent more steel than is considered to be his normal maximum. Prices are unchanged and for local delivery are as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅛ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—There is no resistance to the decline of scrap prices. The mills each week are offering less than the week before, and the larger dealers are not buying except on orders already in hand. One large Eastern mill is now offering only $19, delivered, for No. 1 heavy melting steel, but there was a sale of 1000 tons a few days ago to another mill at $21, delivered. These two prices represent the range of the market. Nearly all other grades have declined 50c. to $1 a ton within the week.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$19.00 to $21.00
Scrap rails	19.00 to 21.00
Steel rails for rolling	23.00 to 24.00
No. 1 low phos., heavy 0.04 and under	27.00 to 29.00
Cast iron car wheels	24.00 to 25.00
No. 1 railroad wrought	24.00 to 25.00
No. 1 yard wrought	22.00 to 23.00
No. 1 forge fire	18.00 to 18.50
Bundled sheets (for steel works)	18.00 to 18.50
No. 1 busheling	19.00 to 20.00
Mixed borings and turnings for blast furnace use	18.00 to 18.50
Machine shop turnings (for steel works use)	18.00 to 19.00
Machine shop turnings (for rolling mill use)	18.50 to 19.00
Heavy axle turnings (or equivalent)	19.00 to 20.00
Cast borings (for steel works and rolling mills)	18.00 to 19.00
Cast borings (for chemical plants)	22.00 to 24.00
No. 1 cast	24.00 to 25.00
Heavy breakable cast (for steel plants)	21.50 to 22.50
Railroad grate bars	19.00 to 19.50
Stove plate (for steel plant use)	18.50 to 19.00
Railroad malleable	22.00 to 24.00
Wrought iron and soft steel pipes and tubes (new specifications)	18.00 to 19.00
Shafting	26.00 to 27.00
Steel axles	26.00 to 27.00

Boston

Foundries Pressing Furnaces for Iron, but Coke Supplies Are Adequate

BOSTON, May 15.—Sales of pig iron were confined to a few hundred tons the past week, the market being duller than at any previous time this year. The little iron sold brought full quotations. Just when a new buying movement will start is problematical. Many foundries say, that with labor conditions as they are, they are well covered into the third quarter On the other hand, they are pressing furnaces for iron, and increases in shipping permits from certain points, notably Buffalo, Alabama and Virginia, are noted. The New York, New Haven & Hartford Railroad has announced it will lift all embargoes Saturday, May 19, consequently is issuing few permits now. No foreign iron was received at this port during the past week.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$35.15 to $36.65
East. Penn., sil. 1.75 to 2.25	34.65
Buffalo, sil. 2.25 to 2.75	34.91 to 35.41
Buffalo, sil. 1.75 to 2.25	34.41
Virginia, sil. 2.25 to 2.75	34.92 to 35.92
Virginia, sil. 1.75 to 2.25	34.42 to 35.42
Alabama, sil. 2.25 to 2.75	38.10
Alabama, sil. 1.75 to 2.25	37.60

Coke.—The New England Coal & Coke Co. has met the Providence Gas Co. price on by-product foundry coke of $15 a ton delivered within the $3.10 freight rate zone, to apply to May shipments. Good Connellsville foundry coke sold in this territory the past week at $7 a ton ovens or $12.55 delivered, $2.45 under the local market. The tonnage involved was small, however. While New England foundries are pushing furnaces for iron, they apparently are well provided with fuel. For the first time in many months, they are requesting New England coke producers to suspend shipments.

Old Material.—The outstanding feature of the old material market is the increase in rejections by Pennsylvania mills on steel, axles and forge fire scrap. Some shippers claim practically everything shipped out of New England is being rejected, with adjustments averaging $2 a ton. A variety of material was purchased by dealers the past week, mostly against old contracts, but no large tonnages. Prices remain unsettled, but are less so on those materials that show any life whatever. Cotton ties are more active at $13.50 on cars, off 50c. Heavy melting steel has been bought at $16.25 and $16.50 on cars and yard wrought at $18, concessions in both cases. Wrought pipe appears to be the weakest spot in the old material market.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$25.00 to $26.00
No. 2 machinery cast	23.00 to 24.00
Stove plate	19.00 to 19.50
Railroad malleable	26.00 to 26.50
Street car wheels	24.00 to 25.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$16.00 to $16.50
No. 1 railroad wrought	19.00 to 19.50
No. 1 yard wrought	17.00 to 18.00
Wrought pipe (1-in. in diam., over 2-ft. long)	12.50 to 13.00
Machine shop turnings	14.00 to 14.50
Cast iron borings, rolling mill	15.00 to 15.50
Cast iron borings, chemical	16.00 to 17.00
Blast furnace borings and turnings	14.00 to 14.50
Forged scrap and bundled skeleton	13.50 to 14.00
Shafting	20.50 to 21.00
Street car axles	20.50 to 21.00
Rails for rolling	18.00 to 18.50

New Books Received

Industrial Furnaces. By W. Trinks. Pages 319, 5¾ x 9 in.; illustrations 255. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York. Price, $4.50.

Proceedings of the Third National Standardization Conference. Pages 388, 6 x 9 in.; illustrated. Published by American Mining Congress, Washington, D. C.

Metal Statistics 1923. Pages 512, 4 x 6 in. Published by the American Metal Market, 81 Fulton Street, New York. Price, $1.

Advertising to Retailers. By R. L. Burdick. Pages 308, 5½ x 8½ in.; illustrated. Published by The Ronald Press Co., 20 Vesey Street, New York. Price, $3.50.

Pulling Together. By John T. Broderick. Pages 167, 4¾ x 7½ in. Published by Robson & Adee, Schenectady, N. Y. Price, $2.

Financial Incentives for Employees and Executives. Volumes 1 and 2. By Daniel Bloomfield. Pages, Volume 1, 325, and Volume 2, 407, 5¾ x 7 in. Published by the H. W. Wilson Co., 958 University Avenue, New York. Price, $2.80 for the two volumes.

Crain's Market Data Book and Directory of Class, Trade and Technical Publications. Third edition, 1923. Pages 497, 6 x 9 in.; illustrated. Published by G. D. Crain, Jr., 537 South Dearborn Street, Chicago. Price, $5.

Preparation, Transportation, and Combustion of Powdered Coal. By John Blizard. Pages 127, 6 x 9 in.; illustrated. Published by Government Printing Office, Washington. Price, 50 cents.

Transactions of the American Foundrymen's Association. Proceedings of the twenty-sixth annual meeting, Rochester, N. Y., June 5 to 9, 1922. Pages 887, 5¾ x 8¾ in.; illustrated. Published by the American Foundrymen's Association, Chicago.

British Iron and Steel Market

Steel Prices Weakening—Tin Plate Lower—Australia Buys American Pipe Plate on Exact Sizes

(By Cable)

LONDON, ENGLAND, May 15.

Pig iron is dull, with consumers waiting for lower prices. But with fuel costs advancing, pig iron makers are unable to reduce prices further.

There is a revival of the export demand for coke, carrying the price up to £3 15s. ($17.33) f.o.b., paid for export. Domestic customers are quoted up to £2 6s. ($10.63).

Foreign ore is weak, consumers being well supplied. Sellers of best Bilbao Rubio ask 24s. ($5.54), ex-ship Tees.

Finished steel is quiet. The works are well sold out, owing to the scarcity of foreign semi-finished material, and are not inclined to reduce prices. Merchants are disposing of contracts below works quotations. Export buying is slack. Australia has placed a substantial pipe plate order in America, as American mills are able to cut exact sizes.

Pig iron exports for April, excluding ferroalloys, were 94,607 tons; the total exports of iron and steel amounted to 386,957 tons.

Continental steel is weak. Belgian makers are anxious to secure orders for fairly quick shipment, but buyers generally hesitate. Japan has made small purchases of merchant bars and wire rods and China has bought merchant bars and angles.

In France, the Société Anonyme des Forges et Acieries du Nord et de l'Est is relighting a second blast furnace at Trith Saint Léger. In Moselle, 23 furnaces are now in blast, out of 66.

In Belgium, the railroad strike is holding up deliveries. At Liège and Charleroi the lines to Antwerp are blocked with trainloads of finished iron and steel destined for export from Antwerp.

Tin plate bars have been reduced 17½s. ($4.04). In response, the tin plate minimum has been reduced 10½d. (20c.) basis. The tin plate market is quiet, but a revival in demand is anticipated on the basis of the new reduction. The works generally are sold out to July.

Galvanized sheets are quiet and easier.

Black sheets are quiet. Japanese specifications are weaker at £20 10s. (4.23c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.62 per £1, as follows:

Durham coke, delivered	£2	4s.	to	£2	6s.	$10.16	to $10.63
Cleveland No. 1 foundry	6	10				30.03	
Cleveland No. 3 foundry	6	5				28.88	
Cleveland No. 4 foundry	6	0				27.72	
Cleveland No. 4 forge	5	17½				27.14	
Cleveland basic	6	0				27.72	
East Coast mixed	6	2½				28.30	
Ferromanganese	18	0				83.16	
Ferromanganese*	20	0				92.40	
Rails, 60 lb. and up	10	0	to	10	10	46.20	to 48.51
Billets	9	10	to	10	0	43.89	to 46.20
Sheet and tin plate bars, Welsh	9	2½				42.16	
Tin plates, base box	1	3 1/16	to	1	3¾	5.34	to 5.49
						C. per Lb.	
Ship plates	10	0	to	10	10	2.06	to 2.16
Boiler plates	12	10	to	13	0	2.58	to 2.68
Tees	10	15	to	11	5	2.22	to 2.32
Channels	10	0	to	10	10	2.06	to 2.16
Beams	9	15	to	10	5	2.01	to 2.11
Round bars, ¾ to 3 in.	11	0	to	11	10	2.27	to 2.37
Galvanized sheets, 24 g.	19	10	to	20	0	4.02	to 4.12
Black sheets, 24 gage	14	10	to	14	15	2.99	to 3.04
Black sheets, Japanese specifications	15	5				3.14	
Steel hoops	11	0	&	13	0*	2.27	& 2.68*
Cold rolled steel strip, 20 g.	23	0				4.74	
Cotton ties, Indian specifications	15	0				3.09	

*Export price.

Continental Prices, All F. O. B. Channel Ports. Delivery as Specified

Foundry pig iron:							
Belgium, June, July	£5	17½s.	to	£6	0s.	$27.14	to $27.72
France, June, July	5	17½	to	6	0	27.14	to 27.72
Luxemb'g, June, July	5	17½	to	6	0	27.14	to 27.72
Billets:							
Belgium, June, July	7	7½	to	7	10	34.07	to 34.65
Merchant bars:						C. per Lb.	
Belgium, July	7	10	to	8	0	1.55	to 1.65
Luxemburg, June	8	12½	to	8	15	1.78	to 1.80
Joists (beams):							
Belgium, July	7	10	to	7	15	1.55	to 1.60
Luxemburg	8	10	to	8	12½	1.75	to 1.78
¼-in. plates:							
Belgium, June, July	8	10	to	8	12½	1.75	to 1.78

Pig Iron Prices Weakening—Fuel Very Strong—Steel Market Quieter—Belgian Offerings Liberal

LONDON, ENGLAND, May 3.—The chief feature the last fortnight has been the weakening of pig iron prices. For the first time this year values have fallen, and although the drop amounts to only 2s. 6d. per ton, it has been sufficient to make consumers still more inclined to wait before entering into any substantial commitments.

Generally speaking, supplies of pig iron are scarce for prompt or early shipments, but there is apparently one firm in a position to offer a good line for fairly early delivery, and this concern took business at a 2s. 6d. reduction. So far no further concessions have been granted but the tone is certainly on the weak side. Fuel, on the other hand, continues a very strong market, and even though the continental demand has diminished, owing to heavy sales of American fuel to that side, producers here are still getting good money, and within the last 10 days the home trade price has gone up about 1s. While this kind of thing goes on we cannot, of course, look for substantial decreases in pig iron prices.

Business both in pig iron and steel has been considerably quieter, and a certain amount of nervousness seems to have developed both among buyers and sellers with regard to the future of the continental position. At the moment, continental material is again being offered, practically all of it from Belgian mills, which country seems to be in a better position than the others, at prices which compare very favorably with those quoted by British makers, but even though sellers seem prepared to go still lower, buyers are not at all anxious to commit themselves, and in consequence the outlook for the continental plants is far from promising.

The weak point in the export markets is India, which country is taking but little interest apart from one or two Government contracts. An encouraging feature, however, is that recently some good orders were booked for South America, which, in the ordinary way, would have gone to Germany.

Labor difficulties are again to the fore in the steel trade, the latest being a lock-out of the boiler makers, and though at one time it was thought that the employers would suspend notices, such hope has been dispelled, and already thousands of men are unemployed in this branch. As a consequence production will naturally suffer and in time other branches will be affected. It is to be hoped, however, that a settlement will be reached before long.

Engineers of the H. Koppers Co., Pittsburgh, are now engaged in preliminary work in connection with construction at Warren, Ohio, of the new by-product coke plant authorized by the Trumbull-Cliffs Furnace Co. Actual construction will commence about the end of May, and will require from 12 to 14 months for completion.

The Liberty Motor Car Co., Detroit, has resumed production under the direction of the receiver after several dates had been set for the sale of the property. The plant has been appraised at $1,040,000, subject to all liens and encumbrances, which amount to approximately $150,000.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c. to 2.60c.

Structural Material

Beams, channels, etc., base, per lb.....2.50c. to 2.60c.
Sheet piling .....2.65c. to 2.75c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c. to 2.50c.
Soft steel bars, screw stock quality.....$3 per ton over base
Reinforcing steel bars, base.....2.40c. to 2.50c.
Refined iron bars, base, per lb.....3.25c.
Double refined iron bars, base per lb.....4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.....8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb. 3.30c. to 3.50c.
Hoops, light gage, under 1 in. wide..... 3.75c.
Bands, base, per lb.....3.30c. to 3.50c.
Strips, base, per lb.....3.30c. to 3.50c.
Cotton ties, per bundle of 45 lb..... $1.60

Cold-Finished Steels

Bars and shafting, base, per lb..... 3.25c.
Strips, base, per lb.....5.25c. to 5.50c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in..... 2.50 over base
Bright plain wire, base, No. 9 gage per 100 lb..... 2.75
Annealed fence wire, base, per 100 lb..... 2.90
Spring wire, base, per 100 lb..... 3.70
Galvanized wire, No. 9, base, per 100 lb..... 3.35
Galvanized barbed, base, per 100 lb..... 3.80
Galvanized staples, base, per keg..... 3.80
Painted barbed wire, base, per 100 lb..... 3.45
Polished staples, base, per keg..... 3.45
Cement coated nails, base, per count keg..... 2.70
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads.....50 per cent off list
Machine bolts, small, cut threads....40 and 10 per cent off list
Machine bolts, larger and longer....40 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.....45 per cent off list
Cut threads .....40 per cent off list
Longer and larger sizes.....40 per cent off list
Lag bolts .....50 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....40 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter .....35 and 5 per cent off list
Larger and longer sizes.....35 and 5 per cent off list
Hot pressed square or hex. nuts, blank.....$3.00 off list
Hot pressed nuts, tapped ..... 2.75 off list
C.p.c. and t. square or hex. nuts, blank..... 3.00 off list
C.p.c. and t. square or hex. nuts, tapped..... 2.75 off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....75 and 5 per cent off list
⅞ in. and larger, U. S. S.....70 and 2½ per cent off list
Small sizes, S. A. E.....75, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 2½ per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk .....75, 10, 5 and 2½ per cent off list
Tire bolts .....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws,
70 and 10 per cent off list
Milled set screws .....70 and 10 per cent off list
Upset cap screws .....75 per cent off list
Upset set screws .....75 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$3.25 to $3.50
Large boiler rivets, base, per 100 lb..... 3.35 to 3.60
Small rivets .....60 and 10 to 60 and 5 off list

Track Equipment

Spikes, ⅝ in. and larger, base, per 100 lb..... $3.15
Spikes, ½ in. ⅞ in. and ¾ in., per 100 lb..... 3.75
Spikes, ⅝ in..... 3.75
Spikes, boat and barge, base, per 100 lb.....$3.50 to 3.75
Track bolts, ¾ in. and larger, base, per 100 lb.. 4.25 to 4.50
Track bolts, ½ in. and ⅝ in., base, per 100 lb.. 5.50
Tie plates, per 100 lb..... 2.55 to 2.60
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Inches	Steel Black	Steel Galv.	Inches	Iron Black	Iron Galv.
⅛	45	19½	⅛ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 and 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel

2 to 2¼ in.	27
2½ to 2¾ in.	37
3 in.	40
3¼ to 3¾ in.	42½
4 to 13 in.	46

Charcoal Iron

1½ in.	+18
1¾ to 1⅞ in.	+ 8
2 to 2¼ in.	— 2
2½ to 3 in.	— 7
3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	55	3 and 3¼ in.	39
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled

3 and 3¼ in.	38	3½ in. and 3¾ in.	39
		4 in.	43

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼-in. O.D. 12 gage	17	5⅜-in. O. D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50 to $6.00

Terne Plate

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11 30	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
		40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3.00c. to 3.35c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.85c. to 4.25c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb. 5.35c. to 5.60c.

Galvanized

No. 28 (base), per lb.....5.00c. to 5.50c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28, (base), per lb.....3.85c. to 4.25c.

Manufactures have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.32	Buffalo	$0.26	St. Louis	$0.43
Philadelphia, export	0.235	Cleveland	0.21	Kansas City	0.735
Baltimore, domestic	0.31	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705
Baltimore, export	0 225	Detroit	0.29	St. Paul	0.60
New York, domestic	0.34	Cincinnati	0.29	Omaha	0.735
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705
Boston, domestic	0.365	Chicago	0.34	Denver	1.27
Boston, export	0.255			Denver (pipe)	1.215

Pacific Coast	$1.34
Pac. Coast, ship plates	1.20
Birmingham	0.69
Memphis	0.385
Jacksonville, all rail	0.50
Jacksonville, rail and water	0.415
New Orleans	0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 30c. to 40c.; sheets and tin plates, 30c. to 40c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 49c.; pipes not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Messabi Bessemer, 55 per cent iron	6.20
Messabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	12c.
Iron ore, Swedish, average 66 per cent iron	11c. to 11.25c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus	48c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	43c.
Manganese ore, Brazilian or Indian nominal	45c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.50
Chrome ore, basic, 48 per cent Cr_2O_3, crude per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$125.00 to $135.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	125.00 to 135.00
Spiegeleisen, domestic, 19 to 21 per cent, seaboard, per ton	45.00 to 47.50
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton, nominal	43.00
Ferrosilicon, 50 per cent, delivered per gross ton	95.00
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace	48.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace	51.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace	55.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace	59.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace	64.10
Silvery iron, 6 per cent, per ton, furnace	37.00
Silvery, iron, 7 per cent, per ton, furnace	38.00
Silvery iron, 8 per cent, per ton, furnace	39.50
Silvery iron, 9 per cent, per ton, furnace	41.50
Silvery iron, 10 per cent, per ton, furnace	43.50
Silvery iron, 11 per cent, per ton, furnace	46.80
Silvery iron, 12 per cent, per ton, furnace	50.10
Ferrotungsten, per lb. contained metal	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr. per lb.	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica per net ton f.o.b. Illinois and Kentucky mines	$20.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica per net ton, f.o.b. Illinois and Kentucky mines	21.50

Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$48.00 to $51.00	$43.00 to $46.00
Ohio	45.00 to 47.00	40.00 to 43.00
Kentucky	45.00 to 47.00	42.00 to 45.00
Illinois	48.00 to 50.00	45.00 to 47.00
Missouri	48.00 to 50.00	38.00 to 43.00
Ground fire clay, per net ton		6.50 to 9.50

Silica Brick:	
Pennsylvania	47.00
Chicago	52.00
Birmingham	48.00
Ground silica clay, per net ton	10.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00
Chrome Brick:	
Standard size, per net ton	50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$45.00 to $46.00
Rolling billets, 2-in. and under	45.00 to 46.00
Forging billets, ordinary carbons	55.00 to 58.00
Sheet bars, Bessemer	45.00 to 46.00
Sheet bars, open-hearth	45.00 to 46.00
Slabs	45.00 to 46.00
Wire rods, common soft, base, No. 5 to ¼-in.	51.00 to 55.00
Wire rods, common soft, coarser than ¼-in.	$2.50 over base
Wire rods, screw stock	$5 per ton over base
Wire rods, carbon 0.20 to 0.40	$3 per ton over base
Wire rods, carbon 0.41 to 0.55	$5 per ton over base
Wire rods, carbon 0.56 to 0.75	$7.50 per ton over base
Wire rods, carbon over 0.75	$10 per ton over base
Wire rods, acid	$15 per ton over base
Skelp, grooved, per lb.	2.45 to 2.50
Skelp, sheared, per lb.	2.45 to 2.50
Skelp, universal, per lb.	2.45 to 2.50

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, per lb.	2.25c.
Rails, light, rerolled, base, per lb.	2.15c. to 2.20c.
Spikes, ⅜-in. and larger, base, per 100 lb.	$3.15 to $3.25
Spikes, ½-in., ⅞-in. and ⅝-in., base, per 100 lb.	3.25 to 3.75
Spikes, ⅛-in., base, per 100 lb.	3.25 to 3.75
Spikes, boat and barge, base, per 100 lb.	3.50 to 3.75
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.25 to 5.50
Track bolts, ¾-in. and larger, base, per 100 lb.	4.25 to 4.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb.	2.50c. to 2.60c.
Bars, rail, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Ground shafting, base, per lb.	3.65c.
Cut nails, base, per keg	$3.40

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100 (1½% Nickel, 10 to 20 per cent Carbon)	$3.75
2300 (3½% Nickel)	5.75
2500 (5% Nickel)	8.25
3100 (Nickel Chromium)	4.75
3200 (Nickel Chromium)	6.50
3300 (Nickel Chromium)	8.75
3400 (Nickel Chromium)	7.75
5100 (Chromium Steel)	4.25
5200 (Chromium Steel)	8.50
6100 (Chromium Vanadium bars)	$5.25 to 5.50
6100 (Chromium Vanadium spring steel)	5.00 to 5.25
9250 (Silico Manganese spring steel)	4.25
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.75
Chromium Molybdenum bars (0.70-1 Chromium, 0.25—0.40 Molybdenum)	5.25 to 5.50
Chromium Molybdenum spring steel (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	5.00 to 5.25

Above prices are for hot-rolled alloy steel bars, forging quality, per 100-lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of $10 per gross ton; on billets smaller than 2½-in. sq. the net ton bar price applies.

Railroads Held Not Responsible for Delays

WASHINGTON, May 15.— A great deal of interest has been manifested in a report made by Examiner John A. McQuillan of the Interstate Commerce Commission recommending dismissal of the complaint of the National League of Commission Merchants of the United States versus the Pennsylvania Railroad, et al.

The finding was that drayage charges incurred by the complainants during the strikes in and around New York harbor, in the spring and early summer of 1920, because of the inability of the carriers to make delivery, were not the result of any violation of the interstate commerce law.

Approval of the report, it is said, will mean that shippers and consigners will have to bear the expense of making their own deliveries, when failure of railroads to make them is due to strike or other conditions over which the carriers have no control.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
May	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
9.....	16.62½	16.25	43.62½	7.35	7.00	7.20	6.85
10.....	16.62½	16.12½	43.87½	7.25	6.95	7.05	6.70
11.....	16.50	16.00	43.12½	7.25	6.90	7.00	6.65
12.....	16.37½	15.75	....	7.25	6.90	7.00	6.65
14.....	16.25	15.62½	42.25	7.25	6.90	6.95	6.60
15.....	16.25	15.50	41.75	7.25	6.90	6.95	6.60

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, May 15.

Weakness in most of the markets, particularly copper, has resulted in considerably lower prices. The declines range from 0.30c. in the case of lead to nearly 2c. per lb. in the case of tin.

Copper.—Marked weakness developed in the electrolytic copper market during the past week and prices have declined 0.75c. per lb. It had been thought that when the market reached 16c., delivered, a buying movement would set in, but weakness in the London market and the general uncertainty in the European situation, combined with willingness of certain sellers in the domestic market to make lower offerings, resulted in further declines until the metal is available today at 15.75c. to 16c., delivered. This sharp decline has taken place in the face of very little buying. It is acknowledged that a large volume of business is ready to be placed by consumers as soon as they are convinced of a stable market. There has been each day a fair volume of inquiry, but it has resulted in almost no business. Consumers are watching the market very closely. They are as a rule well covered for their needs as represented by orders on their books, but it is not believed that a permanent lull in business has arrived. Lake copper, which is more closely held, has not declined to the same extent as electrolytic, but is quoted lower at 16.25c., delivered.

Tin.—Sharp declines have been registered in the Straits tin market, particularly in the last two days. One of the principal causes of the weakness yesterday and today has been the declines in London, which amounted to about £6 per ton yesterday and £2 per ton today. Sales of several hundred tons were made in this market today at a range of 41.37½c. to 42c. We quote the market for spot Straits tin today at 41.75c., New York. On May 8 and 9 the market was very active, with sales for those two days amounting to about 1000 tons, dealers taking by far the bulk of the business. Consumers bought fair amounts of Chinese tin. On May 10 and 11 the market was quiet with no features. On Saturday, May 12, however, there were plenty of sellers who wanted to sell and they exerted such pressure that the market fell as low as 42.50c., but there were no buyers. It is the general belief that tin plate makers will have to buy in the very near future. Yesterday 150 to 200 tons changed hands among dealers in an unenthusiastic market. London prices today were from £9 to £11 per ton lower than a week ago at £197 5s. for spot standard, £195 10s. for future standard and £202 5s. for spot Straits. The feature of these prices is the premium for spot standard over future of nearly £2 per ton, an unusual circumstance. Arrivals thus far this month have been 4220 tons, with the quantity afloat 4804 tons.

Lead.—This market continues very quiet. Late on Wednesday, May 9, the leading interest reduced its quotation to 7.25c., New York. Previous to this, however, on the same day the outside market was weakening, sellers at 7.35c. finding no buyers. Imported lead is still hanging over the market, but the last recession is close to a level sufficiently low to keep foreign metal out of the country. In fact, in the last week the London lead market has advanced nearly every day since the reductions here. An uncertain factor in the entire market is the present low consumption in Europe. Quotations at St. Louis are 6.90c.

Zinc.—The feature of the market has been the publication of April statistics of the American Zinc Institute, which show that stocks in melters' hands were reduced 1045 tons in that month. Production also fell off nearly 2000 tons from that in March, or 46,866 tons in April as against 48,731 tons in March. Prices for prime Western have declined nearly 0.50c. per lb. in the week, the quotations today standing at 6.60c., St. Louis, or 6.95c., New York, for May or early delivery. There is very little demand either for domestic or export shipment.

Nickel.—Quotations for shot and ingot nickel remain unchanged at 29c. to 32c. Electrolytic nickel is held at 32c. per lb. by the leading producers. In the outside spot market shot and ingot nickel are quoted at 29c. to 32c. per lb.

Antimony.—The market is weaker and Chinese metal in wholesale lots for early delivery is quoted at 7.25c. per lb., New York, duty paid.

Aluminum.—The interesting feature is an inquiry for 2,000,000 lb. of 94 to 98 per cent metal for consumption by a leading American steel company. Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted by importers of the foreign metal at 26.50c. to 27c., New York, duty paid. The 99 per cent foreign metal sold at 27.50c. recently. No quotations are available from the leading domestic producer.

Old Material.—The market is very unsettled, values being nominal. Many holders are unwilling to sell at the present low basis, believing that an upward turn may come soon. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	15.75
Copper, heavy and wire	14.25
Copper, light and bottoms	12.00
Heavy machine composition	12.75
Brass, heavy	9.50
Brass, light	7.25
No. 1 red brass or composition turnings	10.75
No. 1 yellow red brass turnings	8.75
Lead, heavy	6.50
Lead, tea	5.50
Zinc	5.00

Chicago

MAY 15.—All of the metals, virgin and old, have declined sharply as the cessation of consumer buying has become more complete. We quote, in carload lots, lake copper, 16.50c.; tin, 43.50c.; lead, 7c.; spelter, 6.70c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 13c.; copper bottoms, 11c.; red brass, 9c.; yellow brass, 7.50c.; lead pipe, 5c.; zinc, 4c.; pewter, No. 1, 25c.; tin foil, 29c.; block tin, 35c., all buying prices for less than carload lots.

Detroit Scrap Market Dull

DETROIT, May 15.—The dearth of inquiry on pig iron in the Michigan district is reflected in the scrap market, melters buying only for current needs.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel	$21.50 to $22.50
Shoveling steel	23.50 to 24.50
No. 1 machinery cast	26.00 to 27.50
Cast borings	16.75 to 17.75
Automobile cast scrap	27.50 to 29.00
Stove plate	19.50 to 21.00
Hydraulic compressed	19.75 to 20.75
Turnings	16.00 to 17.00
Flashings	17.25 to 18.25

The No. 1 90-in. plate mill at South Works, Illinois Steel Co., Chicago, was recently converted from steam to electrical drive. The first plates were rolled with the new equipment April 12.

PERSONAL

Elbridge W. Price has been appointed manager of sales of the Laclede Steel Co., effective May 16, having charge of its northern district with offices in Chicago. He was born in Des Moines, Iowa, and educated in St. Louis. His experience in the steel business began with the Valley Steel Co., East St. Louis, Ill., manufacturer of forgings. After leaving the army with the rank of lieutenant, he went to the Laclede company, which had purchased the Valley Steel Co. Mr. Price has represented the former company successively in Texas, Kansas and Michigan. His office in Chicago will be located at 2056 Continental and Commercial Bank Building.

ELBRIDGE W. PRICE

J. L. Adams, who has been appointed district sales manager in Cincinnati for the Bethlehem Steel Corporation, has been connected with the steel business during most of his life. His boyhood days were spent on a farm in Southern Illinois. He went to Cincinnati in 1883 and after a year in business college accepted a position as stenographer with George Kinsey & Co., dealers in iron and steel products. In 1891, with A. W. Houston, he organized the partnership of Houston & Adams, a steel commission house. Mr. Houston retired from the company in 1896 and the name of the firm was changed to J. L. Adams & Co., which represented, in the Cincinnati district, the Cambria Steel Co., Champion Rivet Co., and several other steel manufacturers. In 1899 the Cambria Steel Co. established a branch office with Mr. Adams in charge. Two years later Mr. Adams and associates organized the Globe Rolling Mill Co., one of the largest steel warehouses in the Central West, and he served as president of this company until its sale to Cleveland interests in 1909. In 1916, when the Midvale Steel & Ordnance Co. purchased control of the Cambria Steel Co., he was appointed manager of sales in Cincinnati and adjacent territory for Midvale and Cambria, continuing in this position until the absorption of these properties by the Bethlehem Steel Co., by which latter company he was appointed Cincinnati representative, effective April 1.

O. C. White, manager for the past two years at Fort Worth for the Youngstown Boiler & Tank Co., has been appointed general sales manager for the company, with headquarters at the home office in Youngstown. A. L. Scudder, formerly district sales manager for the Graver Corporation at Fort Worth, Tex., has resigned and accepted the position made vacant by Mr. White's promotion.

Frederick E. Wheeler, former president and general manager of Finlay-Wheeler, Inc., 262 Pearl Street, Buffalo, dealer in contractors' machinery, has gone to Chicago to become representative of the Blaw-Knox Co. George W. Whitehead, treasurer Finlay-Wheeler, Inc., has assumed the additional duties of manager.

Rodney D. Hall, formerly assistant sales manager of the Snow-Holley Works, Worthington Pump & Machinery Corporation, has been made acting manager of the water works department of the corporation at the New York office.

Thomas W. Delahanty of New York, a graduate of Cornell University and a member of the American Chemical Society and the American Society of Mechanical Engineers, has been appointed to the staff of the Chemical Division, Department of Commerce, at Washington.

Craig Geddis has been appointed assistant sales manager of the Armco ingot iron department, Monongahela Tube Co., Ferguson Building, Pittsburgh.

Frank C. Boes, member of the American Society of Civil Engineers, has joined George C. Jones, Inc., 1270 Broadway, New York, in the capacity of treasurer, in direct charge of sales of road building machinery and construction equipment.

Joseph H. Whittaker of the Hudson Motor Car Co., Detroit, has been appointed factory manager with entire supervision over all departments of manufacture. He has been with the Hudson company for the past 13 years.

W. E. Bowley, who for four years has been connected with the Consolidated Machine Tool Corporation and its predecessors, has been transferred from the general offices in New York to sales offices in Chicago.

T. B. Farrington, master mechanic at the Columbus, Ohio, shops of the Pennsylvania Railroad, has been appointed assistant works manager of the Altoona shops and took up his new duties May 1. R. H. Flinn, master mechanic at Indianapolis, will succeed Mr. Farrington at Columbus.

Edmund Lang has been elected president of the Crocker-Wheeler Co., Ampere, N. J., to succeed Dr. Schuyler S. Wheeler, deceased. Arthur L. Doremus and Clarence N. Wheeler have been elected vice-presidents.

Dr. T. T. Read, supervising mining engineer, Department of the Interior, was assigned to headquarters at Duluth, Minn., May 1. He will assume the duties of superintendent of the north central mining experiment station of the Bureau of Mines at Minneapolis, and will also have general charge of mining investigations in the Lake Superior district.

Hiram Percy Maxim has been made president of the Hartford Engineers' Club, Hartford, Conn., a newly organized body.

J. Verner Critchley was elected president of the Reed-Prentice Co., Worcester, Mass., machine tools, at the recent meeting of stockholders. He succeeds Arthur H. Wood, who continues as a director of the company and a member of the executive committee.

Paul H. Brangs, for many years in charge of the New York office, Heine Boiler Co., St. Louis, has retired, and George F. Murphy, formerly Pittsburgh manager, will have charge of the New York territory, assisted by J. L. Daly and G. A. Knowles. Headquarters will be at 11 Broadway.

H. A. Ely, for some time assistant sales agent in Philadelphia and contiguous territory for the American Steel & Wire Co., has resigned to become associated with the A. Taylor Co., 410 Commerce Street, Philadelphia, as sales manager.

J. M. Rehe has been appointed manager in charge of factory operations of the Westcott Motor Car Co. He takes up the duties of Karl Schreiber, who has returned to the Springfield works of the International Harvester Co. as assistant superintendent. Mr. Rehe is also secretary and treasurer of the Westcott company.

Dr. W. Rosenhain, F.R.S., delivered the thirteenth annual May lecture before the Institute of Metals (British), on Wednesday, May 2. The subject of the discourse was "The Line Structure of Alloys."

O. W. Loomis has been appointed manager of Chicago plants for the National Malleable Castings Co., Cleveland, succeeding O. J. Fehling, resigned. James A. Slater succeeds Mr. Loomis as manager of sales, with headquarters at Cleveland. The Chicago office is at 2610 West Twenty-fifth Place.

Pierre du Pont, who succeeded W. C. Durant as president of the General Motors Corporation in December, 1920, has resigned that office to become chairman of the board. Alfred P. Sloan, previously vice-president, succeeds Mr. du Pont as president.

Joseph C. Devereaux, affiliated with the sales department of the Cambria Steel Co. and the American

Steel Export Co. for several years, has been appointed sales manager of the latter company.

C. W. Forcier, Union Arcade, Pittsburgh, who formerly represented the Titusville Forge Co., Titusville, Pa., has been appointed Pittsburgh representative of the Tacony Steel Co., Philadelphia.

H. M. Slater, New Castle, N. S. W., and R. H. M. Rowe, Melbourne, Australia, officials of the Broken Hill Proprietories Co., New Castle, N. S. W., who are making a tour of American steel plants, were visitors at the Edgar Thomson Works, Carnegie Steel Co., Braddock, Pa., on May 10.

Robert E. Brooke of the E. & G. Brooke Iron Co., Birdsboro, Pa., has sailed for Europe.

J. Carson Agnew of the new firm of Agnew & Batteiger, Philadelphia, will sail for Europe on May 25.

R. W. Light, who has been assistant to the president of the Pittsburgh Crucible Steel Co., Oliver Building, Pittsburgh, has been made assistant works manager, with headquarters at Midland, Pa.

W. J. Filbert, auditor United States Steel Corporation, has been elected treasurer of the American Iron and Steel Institute and a member of the board of directors. Mr. Filbert succeeds E. A. S. Clarke, elected secretary a few months ago.

J. Walter Drake Appointed Assistant Secretary of Commerce

WASHINGTON, May 15—President Harding today approved the appointment of J. Walter Drake, of Detroit, as Assistant Secretary of Commerce. Mr. Drake succeeds Claudius Huston, resigned. He is chairman of the board of the Hupp Motor Car Co., Detroit, and director of the Detroit Pressed Steel Co. and the Charcoal Iron Co. of America and has numerous other business connections.

OBITUARY

GEORGE HENRY BEAUMONT, who had been affiliated with the iron ore and pig iron industry in Cleveland for 33 years with Pickands, Mather & Co., of which firm he had been a partner since Jan. 1, 1916, died May 13, at Palm Springs, Cal., aged 58 years. For the last year or two, he had devoted little attention to business because of poor health and went to California early in April. Mr. Beaumont was born in Cleveland and his home was always in that city. He became connected with Pickands, Mather & Co. in 1899 in a clerical capacity and gradually advanced. About 20 years ago, he was placed in charge of the ore sales and kept in touch with that department until his death. He also had direct charge for many years of the operations of the blast furnaces operated by his firm and had a very wide acquaintance among men associated with the iron and steel industry. He was a member of various Cleveland clubs, including the Union Club, Roadside Club, Kirkland Club and Chagrin Valley Hunt Club. He is survived by his widow, two daughters and three sisters. His body is being taken back to Cleveland for interment. His funeral will take place May 19. Mr. Beaumont made a heroic fight to live, winning the admiration of all who knew him. He had been recognized for years as one of Cleveland's ablest business men in the ore business.

CHARLES M. BOOTH, for many years in charge of sales in the flat wire and spring department of the Worcester works of the American Steel & Wire Co., died at Worcester on Monday, May 14. He started to work for the Washburn & Moen Co. at Worcester in 1883 and, with the exception of one period in other employment, had been continuously connected with the Worcester plant. He had been in ill health for some months.

FRANK E. WING, secretary-treasurer L. S. Starrett Tool Co., and secretary of the Athol Machine Co., Athol, Mass., died on May 13, at his home there, following a long illness. He was born in 1865. Mr. Wing's entire business life was spent with the Starrett company.

EDWARD F. DYER, president Dyer Co., Cleveland, builder of sugar refining equipment and factories, died on May 7 of pneumonia, aged 64 years. He was the son of E. H. Dyer, who was regarded as the father of the beet sugar industry.

THOMAS H. SIMPSON, president and treasurer of the Michigan Malleable Iron Co., Detroit, died on May 9, at his home in that city after a year's illness. He was 64 years old. Mr. Simpson went to Detroit from his home at McConnellsville, Ohio, 40 years ago and became interested in the iron industry. Besides the Michigan Malleable Iron Co., which he organized, he formed and was president and treasurer of the Michigan Sprocket & Chain Co. at the time of his death. He was identified with many other industries during his four decades as a manufacturer in Detroit, some of which he assisted in establishing. He was a former president, as well as one of the founders, of the Detroit Board of Commerce.

HENRY WOODLAND, secretary-treasurer Allis-Chalmers Mfg. Co., died on May 14, of cerebral hemorrhage.

THOMAS NICHOLSON, JR., member of the firm of Nicholson & Co., chain manufacturers, with a plant near Rankin, Pa., died at his home in Swissvale, Pa., on May 7. He was born in Philadelphia and was graduated from Lehigh University as a mechanical engineer with the class of 1883. About 25 years ago, in association with his brother David K. Nicholson, he organized the Pittsburgh Chain Works, trading under the firm name of Nicholson & Co.

JOHN EVERETT ROGERS, secretary Rogers Drop Forge Co., Worcester, Mass., died on May 7, at St. Vincent Hospital, that city, aged 28 years. After graduation from Harvard, Mr. Rogers entered his father's business, L. Hankey & Son, Rochdale, Mass., of which the Rogers company is an offshoot.

JOHN S. HAMPTON, superintendent American Tool Works Co., Cincinnati, died at his home in that city recently, aged 58.

CHARLES O. STANLEY, aged 91 years, one of the pioneer residents of Cincinnati, died at his home in that city May 1. He was long connected with the nonferrous foundry industry, his father having established a brass foundry in Cincinnati over 80 years ago.

WALTER SAMUEL ALLEY, for more than 25 years a representative of Alley & Page, New York, and the firm's predecessors, J. Brooks Fenno & Co., and C. L. Pierson & Co., in their pig iron and coke departments, died May 13 after a brief illness. He was born in New York, and virtually his entire life was spent in the pig iron and coke business. For many years he was a member of Compay A, Twenty-second Regiment, now the 102nd Engineers, and at his death was a member of the Defendam Association of that famous regiment.

SIR WILLIAM BUTLIN, for 24 years chairman and managing director of T. Butlin & Co., Ltd., was found dead in a hotel at Guernsey, England, on May 13, aged 72 years. He was a specialist in the improvement of pig iron and castings.

WILLIAM SHREEVE DORAN, president Alberger Pump & Condenser Co., New York, died at his home in that city May 12 after a few months illness, at the age of 58. He was born in Bristol, Pa., and early in his career became identified with the steam pump making concern of Henry R. Worthington. For years he was regarded as one of the country's authorities on condenser operations. He was long a member of the Engineers' Club and since 1921 was vice-president.

FABRICATED STEEL BUSINESS

Lettings Mostly for Private Projects but New Inquiries for Public Work

A further reduction in the volume of awards for fabricated steel work marks the past week, with most of the lettings for private enterprises. A large part of new proposals is for subway work in New York. Following are the items of chief interest:

Newark Evening News Building, Newark, N. J., 250 tons, to Charles Goeller Construction Co.

Title Guarantee & Trust Co. addition, New York, 375 tons, let to unnamed fabricator.

Church of St. Angelo, Bronx, New York, 300 tons, to National Bridge Works.

Telephone building at Trenton, N. J., 250 tons, let to unnamed fabricator.

McIntosh & Seymour Corporation, Auburn, N. Y., erecting shop, 400 tons, to Bethlehem Steel Bridge Corporation.

New York Edison Co. building at 120th Street, New York, 250 tons, to Harris Structural Steel Co.

Crown Willamette Paper Co., shop buildings, Portland, Ore., 1015 tons, to Poole & McGonigle.

Newburgh Savings Bank Building, Newburgh, N. Y., 222 tons, to Turl Iron & Car Co.

Great Northern Railway, two 98-ft. plate girder spans, 210 tons, to American Bridge Co.

Philips Petroleum Co., tanks in Oklahoma, 6000 tons, to Mount-Cooper Co.

Metropolitan Sewerage Commission, Milwaukee, filter house and dryer room, 1075 tons, to Milwaukee Bridge Co.

Nash Motors Co., Milwaukee, shipping room, 100 tons, to Lakeside Bridge & Steel Co.

University of Michigan, Ann Arbor, Mich., Lawyers' Club and dormitory, 250 tons, to American Bridge Co.

Norfolk & Western bridge work, 1000 tons, to Mt. Vernon Bridge Co.

Akron, Canton & Youngstown Railroad, two bridges, 150 tons, one to American Bridge Co. and one to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Central Railroad of New Jersey, bids received last week on 22,000 tons of fabricated steel for bridge over Newark Bay, but no announcement has been made regarding letting of contract or low bidder.

Flushing subway extension of New York City subways, 6200 tons, bids received last week with McClintic-Marshall Co. low bidder at $109 per ton, erected.

Broadway-Fourth Avenue extension of subway-elevated lines, Brooklyn, 6000 tons, bids to be in next week.

Boston & Maine Railroad, bridges, 500 tons.

Rock Island Lines, 12 deck plate girder spans, 800 tons.

Rockford, Ill., National Bank addition, 400 tons.

Illinois Power Co., Peoria, Ill., power plant, approximately 2000 tons.

Folson Street viaduct improvement, Milwaukee, 500 tons; bids rejected and specifications being revised to reduce cost.

Elks' clubhouse, Milwaukee, 2615 tons; bids rejected and plans being revised to reduce tonnage to 2500 or less.

Awards—10,225.

Pending—15,900.

Keith Theater, Akron, Ohio, 580 tons, bids taken.

Home Savings Bank, Toledo, revised plans issued calling for 200 tons and general contract placed with the Henry Speicker Co.

RAILROAD EQUIPMENT BUYING

New Car and Locomotive Negotiations of Little Moment

The chief items of interest in car and locomotive buying were some purchases of passenger train cars and additional orders for car repairs. Some of the details are the following:

The Mexican Petroleum Co. has ordered 75 tank cars from the Standard Tank Car Co.

The New York, New Haven & Hartford has placed 5 switching engines with the American Locomotive Co.

The Central of Georgia has ordered 5 additional locomotives from the American Locomotive Co., and the Aluminum Co. of America has placed 1 engine with the same builder.

The Burlington is inquiring for 200 combination coal and ballast cars.

The Missouri Pacific has placed 25 additional passenger car repairs with the American Car & Foundry Co.

The Atlantic Coast Line has ordered 15 express, 5 baggage and mail and 2 postal cars and 25 coaches from the Standard Steel Car Co.

The Santa Fe has placed 25 baggage cars with the Pullman Co.

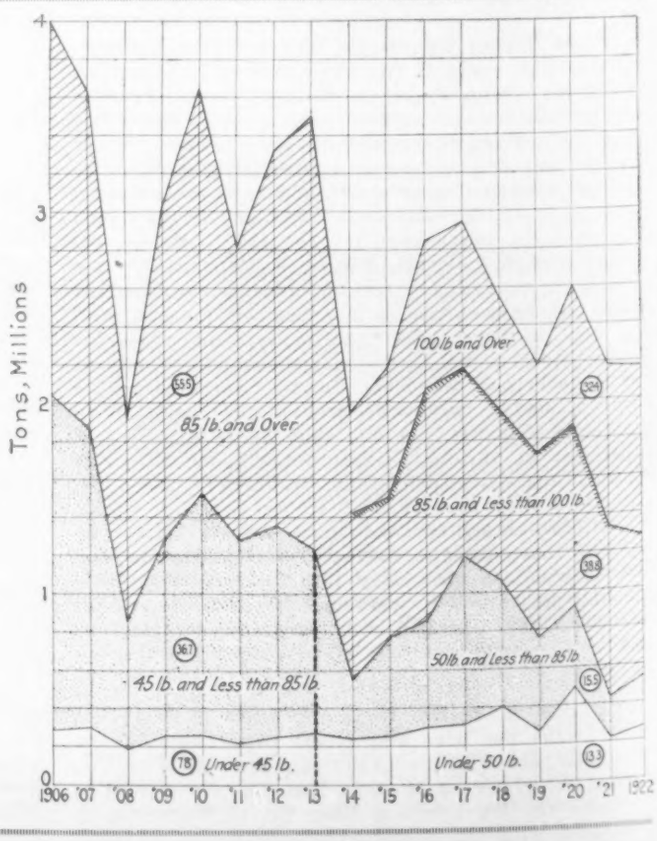
The Phelps Dodge Corporation is inquiring for 66 hopper cars.

The Pere Marquette is inquiring for 25 caboose car underframes.

The Western Pacific contemplates the construction of 50 flat cars in its own shops.

The Bessemer & Lake Erie has placed repairs on 500 box cars with the Greenville Steel Car Co.

THE Diminishing Importance in Volume of Production of Rails Between the Light Class and Those of 85 lb. Weight Per Yard and Over is Shown in the Accompanying Graph. Likewise is the indicated increasing amount of rails of the heaviest type now in demand and also the sustained consumption of light rails. Light rails in the eight years shown before the war took 7.8 per cent of the total, while in the four years since the war the percentage of the total was 13.3 per cent. The intermediate weight rails in the eight years before the war took 36.7 per cent of the total, but in the four years since the war only 15.5 per cent. The heavy rails took 55.5 per cent of the entire production in the average of the eight years before the war, whereas 71.2 per cent was the total for the last four years.



Machinery Markets and News of the Works

MORE RAILROAD INQUIRY

Denver & Rio Grande Western and Nickel Plate in Market

Falling Off in Demand from Automobile Companies and Other Industrial Concerns

As in recent weeks the railroads are figuring more prominently in machine-tool inquiry and buying than any other industry. The Denver & Rio Grande Western has inquired for 147 tools, and the Nickel Plate is asking for prices on more than a dozen machines. Additional lists are expected from the Nickel Plate as its 1923 schedule calls for about $130,000 worth of tools for its own shops and that of its subsidiary, the Lake Erie & Western.

Of pending railroad inquiries that of the Eastern, Joliet & Eastern is at the point of closing and the Chicago & North Western is expected to place orders against a large list in a week or two. The Union Pacific has indicated that it will place further orders soon. The Burlington is still at work preparing a list, but has given no intimation as to when it will be issued. The Louisville & Nashville has bought several small tools. The Baldwin Locomotive Works has purchased 14 cranes for a tank shop and has bought a number of plate-working machines.

There has been a notable falling off in buying by industrial companies and a slackening in orders from automobile companies also is reported. The General Electric Co., Schenectady, N. Y., is one of the most active buyers of tools among industrial companies. The General Fire Extinguisher Co., Providence, R. I., has bought a number of tools.

Leading manufacturers of engine lathes have advanced prices from 5 to 15 per cent, the advance being due, it is stated, to higher production cost. At least one manufacturer of drilling machines has also announced higher prices.

The shortage of machine-shop labor has been relieved to a slight extent at Cincinnati by the arrival of a number of German mechanics who were formerly employed at the Krupp Works. In view of the situation in the Ruhr district, it is expected that there will be an influx of these workmen before long.

New York

NEW YORK, May 15.

SOME representatives of machine-tool builders report that they have received more inquiries in the past week than in the two or three weeks preceding, but the volume of orders, which showed a falling off in April in many lines, has not regained the momentum of March. Current business consists mostly of orders for one or two tools. Dealers handling a variety of machines report that their total sales this month are not on a par with the sales records of the first quarter of the year. They are at a loss whether to ascribe the falling off to the higher prices in effect on practically all lines of tools or to the general business hesitation noticeable in many lines during the past month or so.

The Baldwin Locomotive Works, Philadelphia, has been a fairly large buyer. In addition to the purchase of 14 cranes, mentioned in detail in another column, this plant procured a number of plate-working machines for a new tank shop.

The Consolidated Tool Works, Inc., 296 Broadway, New York, has announced a new price list on its products.

E. D. & A. F. Cronk, Inc., Hotel Street, Utica, N. Y., manufacturer of electric motors and machinery, is taking bids for a two-story machine shop addition. T. H. Williams, Devereaux Block, is architect.

The J. Spaulding & Sons Co., 484 Broome Street, New York, manufacturer of fiber products, plans the construction of an addition to its factory at Tonawanda, N. Y., to cost about $65,000.

The General Fire Extinguisher Co., New York, has been organized with a capital of $11,000,000 to take over and expand the company of the same name with offices at 196 Greene Street. The new company is headed by George C. Comstock, Irving Smith, Jr., and others.

A. R. Brown-McFarlane & Co., Ltd., 90 West Street, New York, iron and steel products, is inquiring for a plate shearing machine for circular plate work.

Bids will be taken until May 29 by the Bureau of Supplies and Accounts, Navy Department, Washington, for automatic boiler regulators for the Brooklyn Navy Yard, as specified in schedule 818.

The Bakelite Corporation, 8 West Fortieth Street, New York, manufacturer of electrical insulation products, has acquired the former plant of the Lake Erie Foundry Co., Painesville, Ohio, for a new branch works.

A manual training department will be installed in the two-story high school to be erected at Huntington, N. Y., estimated to cost $200,000, for which plans have been completed by Frank T. Cornell, Grand Central Terminal Building, New York, architect.

William H. Nicholls, 2 College Place, Brooklyn, manufacturer of molding machinery, etc., is planning the installation of boring mill, 42-in. vertical turret, Bullard type.

A manual training department will be installed in the new high school to be erected at Scotia, N. Y., estimated to cost $265,000. J. M. Ryder, 16 Swan Street, Schenectady, N. Y., is architect.

The Ebco Machine Corporation, New York, has removed its plant from 216 West Eighteenth Street to a new building at 345-49 West Fortieth Street, where additional machinery will be provided for increased production.

M. N. Halpern, 110 West Fortieth Street, New York, machinery dealer, is inquiring for a milling and drilling machine, longitudinal feed.

Bids will be received by the New York Central Railroad Co., C. S. White, purchasing agent, Room 344, 466 Lexington Avenue, New York, until May 18 for one 2000-kw. rotary converter and one 2100-kva. transformer, with switching and auxiliary equipment.

The E. V. Stratton Motors, Inc., Washington Avenue, Albany, N. Y., will install a machine shop in its new ten-story building, 60 x 140 ft., at Washington Avenue and South Hawk Street, estimated to cost $200,000. Strickland, Bodgett & Law, Lyon Block, are architects.

The V. Schiavi Co., Tupper Lake, N. Y., operating a stone quarry, is planning the installation of an air compressor, power-operated stone saw and other equipment.

The American Type Founders Co., Communipaw Avenue, Jersey City, N. J., has awarded contract to the Turner Construction Co., 242 Madison Avenue, New York, for a one, two and three-story plant, 155 x 165 ft., at Elizabeth, N. J., for the manufacture of printing presses and parts. It will cost $500,000. W. M. Kelly is in charge.

The Creamery Package Co., 61-67 West Kinzie Street, Chicago, manufacturer of dairy machinery, refrigerating systems, etc., will operate a branch plant at Jersey City, N. J., where an existing factory recently has been acquired. Another branch factory will be located at Derby, Conn.

The Crane Market

The market for both electric overhead and locomotive cranes shows less activity than for several weeks. There are a fairly large number of inquiries current, particularly for overhead traveling cranes, but few orders are reported this week. Included in pending business is an inquiry from the Phoenix Utility Co., 61 Broadway, New York; a small crane for the Central Railroad of New Jersey; five small cranes for the General Electric Co., Schenectady, N. Y., and one for the West Lynn shops; a 15-ton electric traveling crane for the American Car & Foundry Co., 165 Broadway, New York, with two 15-ton trolleys, a revision of the original inquiry, which called for two 7½-ton trolleys; a special monorail system for the Standard Oil Co. of New Jersey, 26 Broadway, New York; a sizable monorail system, including trolleys and hoists for the Hudson River Foundry Co., Poughkeepsie, N. Y.; and a 20-ton hand power crane for the Kelvin Engineering Co., 106 Front Street, New York. One of the largest purchases of overhead cranes made in this district for some time, was the award of the Baldwin Locomotive Works, Philadelphia, of fourteen electric traveling cranes for the Eddystone plant; six 56-ft. span, two 46-ft. span and one 21-ft. span, all of 10-tons capacity, four 40-ton, 56-ft. span and a 50-ton, 76-ft. span. The Bonney-Floyd Co., Columbus, Ohio, which was recently in the market for a locomotive crane has closed with the McMyler Interstate Co. Sanderson & Porter, engineers, 52 William Street, New York, have purchased a used locomotive crane.

The Elgin, Joliet & Eastern Railroad is inquiring for a 1½-cu. yd. electric bucket crane for Joliet, Ill. The Reliance Steel Casting Co., Twenty-eighth Street, Pittsburgh, is in the market for a 5-ton, 28-ft., 6-in. span crane.

Among recent purchases are:

Central Railroad of New Jersey, Jersey City, N. J., a 25-ton, 43-ft. span gantry crane from the Milwaukee Electric Crane & Mfg. Co.

American Brass Co., Waterbury, Conn., a 4-ton monorail hoist from the Shepard Electric Crane & Hoist Co.

Worth Steel Co., Claymont, Del., a 3-ton, 57-ft. span, 3-motor, overhead traveling crane from the Shepard Electric Crane & Hoist Co.

Berlin Foundry & Machine Co., Berlin, N. H., a 5-ton electric traveling crane from the Whiting Corporation.

Crossley Machine Co., State Street and Chestnut Avenue, Trenton, N. J., a 6-ton, 36-ft. span, 3-motor overhead traveling crane from the Northern Engineering Works.

Underwriters' Laboratory, Chicago, Ill., a 6-ton, 41-ft. span, 3-motor overhead traveling crane from the Northern Engineering Works.

Auburn Water Commission, Auburn, Me., a 4-ton, underhung hand power crane from the New Jersey Foundry & Machine Co.

Whitemore, Rauber & Vicinus, Rochester, N. Y., a 3-ton hand power crane from the New Jersey Foundry & Machine Co.

Mexican Petroleum Co., 120 Broadway, N. Y., a 10-ton, 22-ft span hand power crane for use at Chelsea, Mass., from the Chisholm-Moore Mfg. Co., through William W. Beers & Co., 15 Park Row, New York.

D. C. Elphinstone, Baltimore, Md., a 20-ton locomotive crane for an unnamed user, from the Brown Hoisting Machinery Co.

City of Milwaukee, Riverside Pumping Station, a 25-ton electric traveling crane from the Pawling & Harnischfeger Co. and for Jones Island sewage disposal plant, two 20-ton and three 10-ton overhead traveling cranes with hand-operated bridges from the Milwaukee Electric Crane & Mfg. Co.

Ford Motor Co., Detroit, Mich., a 175-ton, 65-ft. span electric traveling crane for River Rouge power plant, from the Cleveland Crane & Engineering Co.

Pittsburgh Transformer Co., two 15-ton electric traveling cranes from the Cleveland Crane & Engineering Co.

Vulcan Detinning Co., a 12-ton, 3-motor overhead traveling crane for its Neville Island plant, Pittsburgh, from the Shaw Electric Crane Co.

The Monmouth Lighting Co., Keyport, N. J., is contemplating extensions and improvements in its power plant and system. Permission has been granted by the Board of Public Utility Commissioners to issue bonds for $200,000 and stock for $60,000.

The Manual Training Committee, Board of Education, Perth Amboy, N. J., is planning the purchase of a gas furnace for brass and other metal casting work in the vocational training school. John M. Dockstader is principal of the manual training school.

The Carteret Oil & Refining Co., Carteret, N. J., is planning the installation of additional equipment at its storage and distributing plant.

The Keystone Folding Box Co., 42 Spring Street, Newark, will commence the erection of a new plant on Verona Avenue to cost about $50,000, including machinery.

A power house will be erected by the Union Steam Laundry Co., 888 Broad Street, Newark, in connection with a new plant, 100 x 250 ft., on South Fifteenth Street, estimated to cost $120,000. William E. Lehman, 738 Broad Street, is architect.

Smith & Gregory, Newark, have leased property at 48-50 Orange Street for the establishment of a machine and repair shop, with department for automobile parts production.

The Terminal Pattern & Model Works, Inc., 8 Railroad Place, Newark, manufacturer of metal and wood patterns, has leased a portion of the building at 86-96 Monroe Street for a new plant.

A manual training department will be installed in the proposed high school to be erected at Irvington, Newark, by the Irvington Board of Education, to cost $300,000, for which an architect will soon be selected.

The Loesser Mfg. Co., 142 Pine Street, Montclair, N. J., manufacturer of metal specialties, has leased a portion of the building at 161-67 Ogden Street, Newark, for a new plant and will take immediate possession. E. Mills Loesser is head.

John S. Ebersberger, Inc., 188 Wilson Avenue, Newark, manufacturer of wire-bound barrels, cases, etc., has acquired waterfront property, 114 x 250 ft., on the Passaic River, Passaic Street, for the establishment of a new cooperage plant. John S. Ebersberger is president.

William Steinen & Co., Newark, recently organized under State laws with capital of 500 shares of stock, no par value, will succeed the company of the same name at 297 Washington Street, to expand the business now devoted to the manufacture of machine screw products. Other metal goods will be manufactured. William Steinen heads the new organization.

Herman Ellis, 314 Elm Street, Perth Amboy, N. J., is in the market for one 10-ton locomotive crane and one Canton alligator shear. Used equipment will be considered if in good condition.

The Albert Pipe Supply Co., Inc., Berry and North Thirteenth Streets, Brooklyn, N. Y., is in the market for pipe threading machines, 240 volts, three phase, 60 cycle, Landis make preferred. It is also in need of roller cutters and Thomson's butt-welding machines.

The Marf Machine & Die Casting Co., Inc., 147 Forty-first Street, Brooklyn, N. Y., is inquiring for an Ingersoll-Rand air compressor, 8 x 8 in., 125-lb. pressure, Model ER1. Larger size would be considered.

The Cornell Iron Works, Twenty-sixth Street and Eleventh Avenue, New York, is in the market for a 10-ft. hand power bending brake, capacity 18 gage steel.

The American Cable Co., Inc., 291 Broadway, New York, recently incorporated, is the owner of the Newark wire rope mill of the Upson-Walton Co., New York, the Garwood wire rope mill and the Dunellen, N. J., wire mill of the George C. Moon Co., and the Pittsburgh Wire Rope Co., Verona, Pa. It is planned to make extensions at the Dunellen plant and to install wire drawing machinery. C. H. Mathews is president and treasurer, George C. Moon, vice-president and secretary.

The Commercial Solvents Corporation, 17 East Forty-second Street, New York, with plant at Terre Haute, Ind., has arranged a fund of $1,000,000 for the erection of a new plant on site now being selected. It will include a power house, machine shop and other mechanical buildings.

Fire, April 28, destroyed the lumber plant of the N. Dains Sons' Co., Peekskill, N. Y., including woodworking shop, power house and other buildings, with loss estimated at $200,000, including equipment. It is planned to rebuild.

A manual training department will be installed in the two-story high school to be erected at Spring Valley, N. Y., estimated to cost $295,000, for which ground will be broken at once.

New England

BOSTON, May 15.

BUYERS' interest apparently has switched from new to used machine tools, indicated by the disparity of activity in the two grades of equipment the past week. The lack of interest in new machinery is most commonly attributed to the dearth of industrial expansion in this territory and to the growing spread between new and used equipment values.

The most important new tool business the past week was placed by the General Fire Extinguisher Co., Providence, for four radial drills and two 16-in lathes, bought from Worcester, Mass., and two 14-in. lathes from Providence representatives; a 10-in. vertical shaper taken by a Lynn plant, and a fairly large press bought by a Boston manufacturer. Other individual new machines reported sold did not involve more than $300. Prospects of new equipment business do not appear particularly bright. A Massachusetts manufacturer is negotiating on a fairly good list of more or less special designed lathes, and another on press requirements.

Sales of used tools include a No. 3A universal boring machine, a No. 4 Cincinnati milling machine, a 54-in. Bullard boring-mill, a 30-in. x 8-ft. Whitcomb planer, a 30-in. x 12-ft. Flather lathe, a 24-in. Hendey shaper, a Foster No. 3 geared head screw machine, universal tool room grinders, 3 ft. radial drills, numerous small presses, a Van Norman No. 3 miller, and various other kinds and makes of tools. There is a good call for used No. 4 Warner & Swasey tools, but the supply is extremely limited.

All kinds of small equipment and tools sell freely, with the average order of good proportions.

Malleable screw clamps have advanced 10 per cent. An upward revision in the Billings & Spencer line of lathe dogs and clamps is in prospect.

Plans will be ready next month for a proposed two-story, 40 x 56 ft. addition to the South Norwalk Electric Works, South Norwalk, Conn.

Bids are in for the one and two-story, 60 x 200 ft. plant to be erected by the Atlas Metallic Box Co., Everett, Mass. Tuck & Co., 1948 Prospect Avenue, New York, have charge of details.

The following New Bedford, Mass., wood-working plants are making additions and alterations: Z. B. Davis Corporation, 668 Acushnet Avenue, one-story, 60 x 126 ft.; the Washburn Co., 228 North Water Street, two stories, to cost $75,000; Albert Jutras, 729 Belleville Avenue, one-story, 30 x 54 ft.

The Ford Motor Co. has awarded contract for a 10,000 hp. hydroelectric power plant on the Menominee River, near Iron Mountain, Mich., to Stone & Webster, Inc., Boston, engineer. The Boston firm is designing a manufacturing plant for the Ford Motor Co. to be erected adjacent to the High Dam, St. Paul. One unit will have 23 acres of floor space.

The Saco-Lowell Shops, Lowell, Mass., manufacturers of textile machinery, have awarded a general contract to the Aberthaw Co., Boston,, for a manufacturing building 80 x 400 ft., three stories and basement, to cost approximately $350,000.

The Judson L. Thomson Mfg. Co., Roberts Station, Waltham, Mass., manufacturer of rivets, studs, etc., has awarded contract to the Z. H. Whitcomb Construction Co., Boston, for a three-story addition, 51 x 220 ft., estimated to cost $100,000 with equipment. Arthur F. Gray, 53 State Street, Boston, is engineer.

A manual training department will be installed in the proposed high school to be erected at Gardner, Mass., estimated to cost $175,000, for which an architect will be selected to prepare plans in the near future.

The Marlboro Wire Goods Co., Marlboro, Mass., has acquired property on Lincoln Street as a site for a new two-story and basement plant, 70 x 150 ft., for which plans are nearing completion. It will cost about $35,000.

The Mexican Petroleum Corporation, Eastern Avenue, Chelsea, Boston, has plans for a one-story machine shop, 37 x 150 ft.

The Plainville Electrical Products Co., Plainville, Conn., has entered into an agreement with the Trumbull-Vanderpoel Co., Bantam, Conn., manufacturer of electrical switches, etc., to take over the inclosed switch business of the company. The Trumbull company will continue the production of parts and assembling will be carried out at the Plainville works, which will be arranged for larger capacity.

The New Haven Gas Light Co., New Haven, Conn., will commence the construction of a new steam power house on East Chapel Street, with installation to consist of eight boilers, pumping machinery and auxiliary equipment. Westcott & Mapes, Inc., New Haven, is engineer.

Herbert Swanson, care of James H. MacNaughton, 177 State Street, Boston, architect, has awarded contract to the Strahan Construction Co., Boston, for a one-story and basement machine shop, 40 x 50 ft., at Newton, Mass. A list of equipment to be installed will soon be arranged.

H. C. Baum & Co., Plainville, Conn., manufacturers of plated metal goods, are planning for the erection of a three-story factory on Railroad square, 50 x 95 ft., to cost about $55,000, with equipment.

F. B. Horsman, 34 Francesca Avenue, West Somerville, Mass., has plans for a new machine shop and will install lathes, drill press, planer, bench tools and other equipment.

The American Distributing & Mfg. Co., Bridgeport, Conn., recently organized with a capital of $50,000, has leased property at 350 George Street and will operate a plant for the manufacture of a patented tape-sealing machine. H. B. Slauson is president and treasurer.

Quarrying machinery, automatic pulverizing and refining equipment, with power house and machine shop will be installed at the proposed plant of the Ford Motor Co., Highland Park, Mich., at its recently acquired garnet properties at Danbury, near Franklin, N. H., heretofore held by the Garnet Grit Co. The garnet powder output will be used at the glass plant of the Ford company at Glassmere, Pa., lately purchased from the Allegheny Plate Glass Co.

The Paramount Specialty Tool Co., Waltham, Mass., is arranging for enlargements at the plant of the Hurlbut-Rogers Broach Co., Hudson, Mass., recently acquired. The Waltham business has been removed to the Hudson plant and operations will be concentrated at this point. Additional equipment will be installed.

The Hunt-Spiller Mfg. Co., 383 Dorchester Avenue, South Boston, manufacturer of iron castings, will commence the erection of three additional foundry units, each one-story, totaling 135 x 240 ft.

A manual training department will be installed in the new high school to be erected at Rockville, Conn., estimated to cost $300,000, for which bids will soon be asked on a general contract. Walter B. Chambers, 111 East Fortieth Street, New York, is architect.

Philadelphia

PHILADELPHIA, May 14.

CONTRACT has been awarded to the Wark Co., 231 South Broad Street, Philadelphia, for a new building at Forty-second Street and Woodland Avenue, on site 100 x 170 ft., to be occupied by the Mack International Truck Corporation as a factory branch. The company operates plants at Plainfield, N. J., and Allentown, Pa.

Henry Levis & Co., Commercial Trust Building, Philadelphia, machinery dealers, have inquiries out for an industrial locomotive, 36-in. gage, 4-wheel saddle tank, Vulcan type; also for a boom for a Bucyrus steam shovel.

The Atwater Kent Mfg. Co., 4937 Stenton Avenue, Philadelphia, manufacturer of electric starting equipment, radio apparatus, etc., has commissioned the Ballinger Co., 105 South Twelfth Street, architect, to prepare plans for the initial unit of its proposed plant on property lately purchased at Wissahickon and Abbotsford Avenues. It will consist of a main one-story factory with power house, estimated to cost $200,000 with machinery. A. Atwater Kent is head.

The Commercial Truck Co. of America, Twenty-seventh and Brown Streets, Philadelphia, has inquiries out for a used vertical turret lathe.

The Keystone Supply & Mfg. Co., 927 North Ninth Street, Philadelphia, manufacturer of pipe, plumbing equipment, etc., is taking bids for a branch plant at Lansdowne, Pa. Frank E. Hahn, 1112 Chestnut Street, is architect.

The Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, will discontinue operations at its Mount Vernon power house and will convert the structure for an electric sub-station.

The American Boiler & Foundries Co., Philadelphia, has acquired property at 108-10 Walnut Street, for local headquarters and plant.

The Philadelphia Commercial Museum, Thirty-fourth Street, has an inquiry from a company at Panama City, Panama, for cutting, bending and molding machinery for tin plate and other metal. Also from a concern at Vienna, Austria, for machinery for the manufacture of fiber and paper containers.

Fire, May 7, destroyed a portion of the plant of the J. L. Mott Co., Hancock Avenue Avenue, Trenton, N. J., manufacturer of enameled iron products, with loss estimated

at $30,000. The bulk of loss was confined to the enameling department which will be rebuilt at once.

The Chamber of Commerce, Steacy-Trent Hotel, Trenton, N. J., is in negotiation with a company manufacturing die-castings and metal stampings, which proposes to establish a local plant with floor space to approximate 25,000 sq. ft. The name will be announced at an early date. A machinery manufacturing company is also planning to locate at Trenton and is in contact with the Chamber of Commerce for an existing building to accommodate from 800 to 1000 operatives. The company name is temporarily withheld. Secretary Lochner, Chamber of Commerce, is in charge.

A manual training department will be installed in the new high school to be constructed at Moorestown, N. J., estimated to cost $150,000, for which bids are being taken on a general contract until May 24. The local school board is in charge.

Fire, May 5, destroyed the plant of the American Slate Works, Slatington, Pa., with loss estimated at $100,000 including machinery. Plans for rebuilding are being considered. William Harding is general manager.

The Magnetic Pigment Co., 601 Cass Street, Trenton, N. J., has awarded contract to the N. A. K. Bugbee Co., 206 East Hanover Street, for a four-story addition, 45 x 67 ft., estimated to cost $45,000 with equipment.

The Lebanon Engineering & Supply Co., Twelfth Street, Lebanon, Pa., plans for the installation of a power shear for steel cutting.

A manual training department will be installed in the two-story and basement high school to be erected at Flourtown, Pa., estimated to cost $200,000. Ritter & Shay, North American Building, Philadelphia, are architects.

Fire, May 9, destroyed the plant and machinery of the Plymouth Anthracite Coal Washery, Snydertown, Pa., with loss estimated at $100,000. It is planned to rebuild.

S. B. Bishop, Mansfield, Pa., has plans for a one-story machine shop at South Main Street and Normal Place, estimated to cost $20,000.

Julius Keller, head of the Deemster Automobile Co., London, England, now in this country, is completing negotiations for the purchase of the plant of the Worthington Pump & Machinery Co., Hazleton, Pa., and will remodel it for an American branch plant.

A manual training department will be installed in the new three-story high school, 100 x 120 ft., to be erected at Mechanicsburg, Pa., estimated to cost $150,000, for which plans are being prepared by C. J. Lappley, Cotterel-Ebner Building, Harrisburg, Pa., architect.

Berkey H. Boyd, Superintendent of Public Grounds and Buildings, Harrisburg, Pa., will take bids until May 24 for two low pressure watertube boilers, electrically-operated vacuum pump and auxiliary equipment, for installation at the State power house.

The Keystone Coal & Coke Co., Salemville, Pa., has tentative plans for rebuilding the portion of its coal washing and coking plant destroyed by fire May 5, with loss estimated at $100,000, including machinery and power equipment.

The East Penn Electric Co., Pottsville, Pa., is completing negotiations for the purchase of the plant and system of the Lykens Valley Light & Power Co., Lykens, Pa.; also for the purchase of the Pine Grove Electric Co., Pine Grove, Pa. Extensions and the installation of machinery will be made in the plants.

Fire, May 8, destroyed a portion of the plant of the Reading Foundry & Supply Co., Seventh Street, Reading, Pa., with loss estimated at $40,000, including equipment. It is planned to rebuild.

The Roulette Glass Co., Corning, N. Y., recently formed with a capital of $3,200,000, is considering a site at Roulette, Pa., for its new works and will have plans drawn at an early date. It will be equipped for the manufacture of vacuum bottles and is estimated to cost $400,000. George S. Goff, Corning, is head.

The West Virginia Pulp & Paper Co., 200 Fifth Avenue, New York, is considering plans for a new two-story pulp and paper mill at Tyrone, Pa., 80 x 150 ft., to cost $100,000 with machinery.

The West Pennsboro-Carlisle Electric Co., Carlisle, Pa., has been organized under State laws to build a power plant and system in this section. George M. Hayes and John R. Munroe, Carlisle, head the company.

Fire, May 7, destroyed a portion of the plant of the American Briquette Co., Lykens, Pa., manufacturer of anthracite fuel briquettes, with loss estimated at $50,000 with machinery. It is planned to rebuild. Malcolm Orr is superintendent.

The Ford & Kendig Co., Philadelphia, is inquiring for a new or second-hand 12-in. pipe cutting and threading machine, with all parts in good order except the die head and chasers which are not needed. The machine required is one which can mount a Landis die head and which can be arranged for motor drive.

Baltimore

BALTIMORE, May 14.

NEGOTIATIONS are being completed by the Board of Trade, Havre de Grace, Md., and the Tiger Tire Co., Toronto, Ont., for the erection of a plant to manufacture tires and other rubber goods. The initial plant will cost about $200,000 with machinery.

The Baltimore Gas Appliance Co., Bayard Street, Baltimore, has awarded a contract to the B. F. Bennett Building Co., 123 South Howard Street, for the erection of three additions, one, two and three-stories respectively, 45 x 194 ft., 57 x 64 ft. and 25 x 65 ft., to cost about $50,000.

The Standard Electric Machinery Co., 7 East Hill Street, Baltimore, machinery dealer, is inquiring for one d.c. motor, 75 to 100 hp.; also for a 4-drum electric hoist, with swinging gear; three 35 to 40 kva. transformers and one 20-ton steam industrial locomotive, standard gage.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until June 5 for 20,730 ft. of steel wire rope, for the Puget Sound and Mare Island navy yards,, schedule 819; also for 34,400 ft. of steel conduit, schedule 820, and 80 electric soldering irons, schedule 810, for the Mare Island yard.

The Gordonville Motor Co., Inc., Gordonville, Va., plans the installation of a lathe, drill press and other machine tools.

The Columbus Electric & Power Co., Columbus, Ga., is arranging a fund of about $100,000 for extensions and improvements in its power plant and system and the installation of additional equipment. R. M. Harding is general manager.

A manual training department will be installed in the two-story and basement high school to be erected at Havre de Grace, Md., estimated to cost $150,000, for which plans are being prepared by Hamm & Witman, City Bank Building, York, Pa., architects.

Bids will be taken by the Chief of Engineers, United States Army, Washington, until June 15 for two Diesel engine generating sets, complete with auxiliaries, and miscellaneous spare parts for engines and generators, 150 kw. and 300 kw. capacity, respectively.

T. N. Kendler, Richmond, Va., operating a sheet metal works at 5 East Marshall Street, is planning the installation of a portable pipe vise, square shears, 30 in., and other metal-working equipment.

The Trexler Co., Wilmington, Del., manufacturer of automobile equipment and accessories, is planning for enlargements and the installation of additional equipment.

The North State Feldspar Co. Micaville, N. C., recently organized with a capital of $250,000, has plans for the installation of a feldspar mining and reduction plant, with power house, estimated to cost $90,000. B. B. Siller is head.

An electric power plant will be installed by the Concord Knitting Co., Concord, N. C., recently organized with a capital of $100,000, in connection with its proposed local mill. A. R. Howard is president.

The Economy Concrete Co. of Virginia, South Richmond, recently organized with a capital of $100,000, will commence the erection of a one-story plant, 100 x 160 ft., and will install a rock crusher, concrete-mixing and molding machinery, electric crane and other equipment. J. Scott Parrish is president.

The Wicomico Board of Education, Salisbury, Md., will establish a vocational department at the local grammar school. It is purposed to have the department ready June 25 for a summer course.

The Cardwell Machine Co., 1900 East Cary Street, Richmond, Va., is planning for the installation of an electrically-operated hammer for forging production.

The High Point Bending & Chair Co., Siler City, N. C., has plans for a three-story addition, 85 x 115 ft., and will install considerable machinery, motors and other equipment. C. B. Thomas is general manager.

L. A. Wilson, Newberry, S. C., is contemplating the erection of a local plant for the manufacture of brick and tile products to cost $50,000. Inquiries are out for molding, conveying and other machinery, with motors, etc.

The Southern Power Co., Charlotte, N. C., will defer the construction of its proposed 80,000 hp. hydroelectric generating plant, to cost $600,000, and will hold the project in abeyance. J. B. Duke is president.

Bids will be received by the General Purchasing Officer, Panama Canal, Washington, until May 24 for wire cloth,

bolts, nuts, rivets, spring steel wire, milling cutters and other equipment for canal zone service, Panama circular 2324; until June 4 for electrical equipment for towing locomotives, Panama circular 1529.

The Beverly Stone & Sand Co., Liberty, S. C., has inquiries out for a 30 to 36-in. gyratory crusher; 48-in. revolving screen; conveyor equipment and other machinery.

The Aquia Creek Quarries Corporation, Fredericksburg, Va., recently organized to operate sandstone quarries in this section, will install a complete mining plant, industrial railroad, etc., at its local properties, estimated to cost $55,000. Arthur Middleton, Victor Building, Washington, patent attorney, is secretary and treasurer.

The Ornamental Stone Co., 129 Brevard Court, Charlotte, N. C., C. J. Helms, secretary and treasurer, will commence the erection of a one-story plant, 75 x 300 ft., with power house, to cost $65,000.

The Coggins Marble Co., Canton, Ga., is in the market for a 50 kw., d.c., belt-driven electric generator, with switchboard and auxiliary equipment.

The Board of Education, Baltimore, has plans for a three-story and basement school, 180 x 350 ft., and one-story and basement vocational building adjoining, 65 x 160 ft., and will soon take bids. The cost is estimated at $600,000. Smith & May, Calvert Building, are architects.

A manual training department will be installed in the proposed high school to be erected at St. Matthews, S. C., estimated to cost $95,000, for which plans will soon be prepared.

The Water Commission, Hagerstown, Md., plans the installation of electrically-operated pumping machinery and auxiliary equipment in connection with proposed improvements and extensions in the waterworks plant and system, estimated to cost $2,000,000.

The J. G. Skelton Co., Inc., Railway and Power Building, Richmond, Va., is planning the equipment of a galvanizing plant. Inquiries are being made for equipment.

C. M. Wall & Son, Lexington, N. C., are planning to rebuild their wood-working plant and power house recently destroyed by fire. Inquiries are being made for a Corliss engine, boilers, pumps and auxiliary equipment, and cooperage machinery.

Pittsburgh

PITTSBURGH, May 14.

MACHINE tool business in this territory is holding up well, the month making a favorable comparison with April which, though less active than March, was the best month of the year with some dealers. New inquiries possibly are fewer, but much business is pending. In the heavier lines of equipment sales show some falling off.

The Westinghouse Electric & Mfg. Co. is getting its Sharon, Pa., plant in shape for the manufacture of transformers.

The Vulcan Detinning Co. has bought a 300 kw. motor generator set with transformers for its Neville Island plant from the Westinghouse Electric & Mfg. Co.

The Aluminum Co. of America, Oliver Building, Pittsburgh, is taking bids on a 12-ft. high pressure accumulator for its New Kensington plant.

Construction will commence on a new steel fabricating plant by the John L. Mullen Construction Co., Wabash Avenue, Pittsburgh, on site, 200 x 300 ft., recently acquired on Banksville Avenue, to cost $75,000. The company is operating similar works at Lawrenceville, which will be continued. John L. Mullen is head.

The Mine Safety Appliance Co., 909 Chamber of Commerce Building, Pittsburgh, has asked bids on a general contract for a new four-story plant, 62 x 144 ft., at Braddock Avenue and Mead Street, to cost $150,000 with equipment. B. H. Prack, Keystone Building, is architect. George L. Deike is president.

The Conroy-Prugh Co., 1430 Western Avenue, Pittsburgh, manufacturer of glass products, is taking bids on a general contract for a four-story and basement addition, 60 x 105 ft., estimated to cost $90,000 with machinery. A. M. Bowman, Bessemer Building, is engineer.

Fire, May 7, destroyed a portion of Plant No. 1 of the Conewango Refining Co., Warren, Pa., manufacturer of refined oils, gasoline, etc., with loss estimated at $600,000, including machinery. It is planned to rebuild. The company is operated by the Fred G. Clark Co., 1081 West Eleventh Street, Cleveland.

The Martin-Hardsogg Co., 922 South Avenue, Pittsburgh, manufacturer of mechanical equipment, will build a three-story machine shop, 30 x 112 ft., at 918 Reedsdale Street, to cost approximately $30,000. R. M. Trimble, Ferguson Building, is architect.

The Waverly Oil Works Co., Fifty-fourth Street and the Allegheny Valley Railroad, Pittsburgh, has plans for an addition to its refinery, to cost $80,000 with machinery. The Hunting-Davis Co., Century Building, are architects.

The receivers for the Pittsburgh Railways Co., 435 Sixth Avenue, Pittsburgh, have been authorized to purchase four double truck dump cars at a cost not to exceed $48,000. C. A. Fagan and W. D. George are receivers.

The Penn Public Service Corporation, Johnstown, Pa., is disposing of a bond issue of $2,500,000, the proceeds to be used for acquiring a controlling interest in the Erie Lighting Co., Erie, Pa., and for extensions and improvements in the plant and systems. F. T. Hepburn is president.

The Westinghouse Air Brake Co., Westinghouse Building, Pittsburgh, has awarded contract to the John Eichleay Jr., Co., Oliver Building, for an addition to its plant at Robinson and Dasher Streets, to cost $75,000.

The McKinney Mfg. Co., Metropolitan and Liverpool Streets, Pittsburgh, manufacturer of hardware products, has awarded contract to the Henry Shenk Co., Century Building, for a one-story building at Preble and Pennsylvania Avenues, to cost $150,000. The Hunting-Davis Co., Century Building, is architect.

A manual training department will be installed in the high school to be erected at Indiana, Pa., estimated to cost $450,000, for which bonds are now being arranged.

The Kanawha Mfg. Co., Charleston, W. Va., manufacturer of mining equipment, boilers, tanks, etc., will commence the erection of a one-story addition, 65 x 160 ft. A two-story structure, 36 x 70 ft., will also be built.

F. Lory & Sons, Charleston, W. Va., are making inquiries for a steam hoisting engine, single drum, slow speed, vertical or horizontal.

The Oak Hill Water Co., Oak Hill, W. Va., will install electrically-operated pumping machinery and auxiliary equipment at its plant. R. R. Thomas is president.

The Borough Council, Conneautville, Pa., will acquire the plant and system of the United Electric Co., and operate as municipal property. Extensions and the installation of additional equipment are planned.

The United States Window Glass Co., Morgantown, W. Va., has arranged for a bond issue of $350,000, a portion of the proceeds to be used for the installation of additional power equipment and other machinery, including gas producers, etc. Walter A. Jones is president.

Buffalo

BUFFALO, May 14.

WORK will commence on a one-story plant at 90 Arthur Street, Buffalo, for the Buffalo Bronze & Die Casting Co. A list of equipment will soon be arranged.

The Jamestown Gas Stove Co., Jamestown, N. Y., with plant at Corry, Pa., is planning the erection of a new factory at Jamestown, estimated to cost $60,000 with equipment.

A manual training department will be installed in the proposed high school to be erected at Victor, N. Y., estimated to cost $200,000, for which an architect will soon be selected.

The Truck Equipment Corporation, Fillmore Avenue and Appenheimer Street, Buffalo, manufacturer of automobile truck equipment, plans the installation of additional machinery. E. R. Boeck is head.

Fire, May 7, destroyed the machine shop at the plant of the Canisteo Iron Works, Hornell, N. Y., with loss estimated at $25,000. It will be rebuilt. W. D. Carter heads the company.

Walter Ackerman, city manager, Watertown, N. Y., will receive bids until May 25 for a municipal hydroelectric power plant, 40 x 115 ft. Paul B. Sutton is city engineer.

The Willard Service Station, 624 State Street, Watertown, N. Y., has inquiries out for a high speed drill and power-operated metal saw.

The Niagara Falls Arena Co., Inc., Niagara Falls, N. Y., will build an ice-manufacturing and refrigerating plant, with capacity of about 60 tons per day, in connection with a new ice rink on Victoria Avenue, estimated to cost $180,000.

The Elmira Foundry Co., Woodlawn Avenue and Main Street, Elmira, N. Y., is planning the erection of a new foundry, one-story, 115 x 220 ft., to cost $120,000 with equipment.

The General Glass Co., Rochester, N. Y., recently organized with a capital of $1,000,000, has acquired the plant of the Geneva Glass Products Co., Geneva, N. Y., and will take immediate possession. Additional machinery will be installed and the plant operated for the manufacture of a

general line of glass products. The new company is headed by Henry J. and Earl H. Crowder, both of Rochester. Louis E. Fuller, Rochester, attorney, is representative.

The Empire Gas & Electric Co., Castle Street, Geneva, N. Y., plans the construction of a steel gas holder, 96 ft. in diameter and 100 ft. high, to cost about $160,000 with equipment.

A manual training department will be installed at the three-story high school at Prattsburg, N. Y., in connection with rebuilding the portion of the structure recently destroyed by fire. It will cost about $90,000. E. Edgar Hill, Loan Association Building, Geneva, N. Y., is architect.

D. J. Renaud & Son, 672 West End Avenue, Carthage, N. Y., operating a foundry, are planning the installation of additional equipment.

The Buffalo General Electric Co., Buffalo, has plans under way for a one-story building, 103 x 180 ft., in the vicinity of its power plant on Niagara Street, to be used as a machine shop and service works for company motor trucks and cars. William S. Huntley is vice-president.

The E. D. Schell Co., La Fargeville, N. Y., operating a machine and repair works, plans the installation of a milling machine, portable electric drill and other equipment.

A manual training department will be installed in the new senior and junior high school to be erected at Hamburg, N. Y., estimated to cost $350,000, for which bids will be received on a general contract until May 28. Frank A. Spangenberg, 250 Delaware Avenue, Buffalo, is architect.

The W. G. Hamilton Co., 259 State Street, Carthage, N. Y., manufacturer of metal products, plans the installation of a power-operated punch press and other equipment.

The Adirondack Mineral Co., Inc., Carthage, N. Y., has plans under way for a new one-story plant, 50 x 100 ft., to cost close to $45,000 with machinery. C. R. Outterson is head.

Cleveland

CLEVELAND, May 14.

THE Nickel Plate Railroad, through W. P. Dittoe, purchasing agent, Cleveland, has issued a list of 13 machine tools, part of which will be purchased for the Lima, Ohio, shops of its subsidiary, the Lake Erie & Western Railroad. Additional lists are expected from this road later, as its 1923 schedule calls for $80,000 worth of new machinery for its own shop and $50,000 for the Lake Erie & Western.

Orders and inquiries fell off somewhat the past week. There is a noticeable slackening in demand from automobile companies which recently have been heavy buyers of machinery, some of which cannot be delivered until well along in the summer. One local drilling machine manufacturing company, which has taken some large orders from automobile plants, reports that it has enough business on its books to operate five months at as full capacity as the supply of labor will permit.

Outside of the automobile field there is a fair volume of business, and one manufacturer of turret lathes reports that its May sales so far had been equal to those in April. Some inquiry is coming from Akron tire companies, but these are showing a disposition to delay the placing of orders, except for machines that are needed immediately.

The demand for used machinery continues fairly heavy. A buyer for a group of southern California machine shops which do work for oil companies is picking up used tools in Cleveland and other Central Western and Eastern markets. The requirements include considerable equipment in radial drills, boring machines, shapers and large bore lathes.

The list of the Nickel Plate Railroad is as follows:

One pipe threading machine
One sensitive single spindle drilling machine
One ball bearing single spindle drilling machine
One high speed single spindle drilling machine
One 42 in. heavy duty vertical boring and turning machine
One 24 in. shaper
One 48 in. x 48 in. x 18 ft. planer.
One 30 in. x 18 ft. lathe
One 16 ft. x 8 ft. lathe
One 18 in. x 10 ft. lathe
One 24 in. x 10 ft. lathe
One 24 in. x 12 ft. lathe
One 20 in. x 14 ft. lathe

The lathes are all to be provided with individual motor drive.

The Shelby Spring Hinge Co., Shelby, Ohio, has awarded contract for a two story addition, 161 x 171 ft.

The Cleveland Structural Steel Co., 6600 Park Avenue, Cleveland, will erect a new fabricating shop 60 x 100 ft.

The Pebbles Engineering Co., Youngstown, Ohio, has purchased the plant of the Akron-Newton Falls Co., Newton Falls, Ohio, and will equip it for the manufacture of cranes and freight car repair work. The present building will be used for foundry purposes and additional structures will be erected. J. W. Pebbles is president, and J. A. Pebbles, vice-president and general manager.

The H. H. Miller Industries Co., Inc., Canton, Ohio, has purchased the Charles Skidd Mfg. Co., Janesville, Wis., and will move the equipment to Canton. The Miller company recently erected a new plant in which this equipment will be placed. The product of the Skidd company includes machinery for milk bottling plants and other dairy equipment.

A. L. Disbenett has opened a pattern shop in Marion, Ohio, under the name of the Disbenett Cabinet & Pattern Works, and in addition to making patterns will manufacture other products.

The Cleveland Heater Co., 1905 West 112th Street, Cleveland, has placed contract for the erection of a one story addition, 30 x 240 ft.

The Cleveland Railway Co., Cleveland, will build six automatic sub-stations and has placed an order with the Westinghouse Electric & Mfg. Co. for the equipment, amounting to approximately $500,000.

The Truck Engineering Co., manufacturer of automobile truck parts, Cleveland, has purchased two acres in Fort Wayne, Ind., and will erect a factory containing 6000 sq. ft. of floor space.

Detroit

DETROIT, May 14.

PLANS are being considered for the erection of a one-story foundry addition by the Regent Stove Co., Walnut and Fourth Streets, Wyandotte, Mich. Thomas H. Conway is head.

A manual training department will be installed in the new three-story and basement high school to be erected at Algonac, Mich., estimated to cost $125,000, for which bids on a general contract will soon be asked. Warren M. Holmer, Tussing Building, Lansing, Mich., is architect.

The Superior Piston Ring Co., 226 Bates Street, Detroit, is planning for the installation of a grinding machine and other equipment.

Fire, May 7, destroyed a portion of the plant of the Northwestern Pulp & Paper Co., Petoskey, Mich., with loss estimated at $100,000, including machinery. It is planned to rebuild.

A manual training department will be installed in the new two-story high school to be erected on River Street, Holland, Mich., estimated to cost $90,000, for which bids have been asked on a general contract. J. Daverman Chamber of Commerce Building, Grand Rapids, Mich., is architect.

The City Department of Purchases and Supplies, 700 Marquette Building, Detroit, has inquiries out for a 42 in. drill press.

The Michigan Iron, Land & Lumber Co., Iron Mountain, Mich., has plans in progress for a new electric generating plant estimated to cost $1,000,000. Mead & Seastone, Journal Building, Madison, Wis., are engineers.

The Checker Cab Mfg. Co., Chicago, has acquired the main factory unit and equipment of the Handley Motors Corporation and the body plant of the Dort Motor Car Co., both at Kalamazoo, Mich., and will move its headquarters to that city. The Handley property includes a factory, 80 x 800 ft., a heating plant and 38 acres. The Dort property is a four-story building with 200,000 sq. ft. of floor space. The transaction is said to involve between $2,000,000 and $3,000,000.

The R & A Lumber Yards Co., with main offices in Alpena and Bay City, has purchased a 5-acre site on the Pere Marquette belt line at Flint and will erect a plant for the manufacture of cement tile shingles.

The Automotive Utilities Corporation, Detroit, manufacturer of Trail-Ford trucks, steel dump bodies, and special wheel equipment for the Fordson tractor, will move to Mount Clemens, Mich., where it has purchased seven acres on the Grand Trunk Railroad on which is a partially complete factory, 60 x 200 ft. The structural steel work has been completed and the company is asking bids to have the building inclosed.

The plant of the New Haven Foundry Co., New Haven, Mich., was completely destroyed by fire April 28, becoming ignited from a kerosene torch used in lighting the cupola. Plans for the future have not yet been announced.

The American Furnace & Foundry Co., Milan, Mich., has broken ground for an addition, 80 x 100 ft. It will be utilized for offices and manufacturing space to meet the increased business of the company.

Chicago

CHICAGO, May 14.

PROSPECTIVE railroad buying is the feature of the machine tool market. The Denver & Rio Grande Western has issued a list of 147 tools which will be bought here by Battey & Kipp, Inc., consulting engineers, of this city. Of pending inquiries, that of the Elgin, Joliet & Eastern is at the point of closing and the Chicago & North Western is expected to place orders in a week or two. The Burlington is still at work preparing a list, but has given no intimation as to when it will be issued. The Union Pacific has indicated that it is about to place additional orders against its list, part of which was bought some time ago. There has been a notable falling off in buying by industrial companies, although occasional orders for one or two machines are still being placed.

Further price changes have been made. Most of the leading lines of engine lathes have gone up 5, 10 and 15 per cent and a manufacturer of upright drills has announced an advance of 15 per cent.

The Santa Fe has issued inquiries for a 20-in. drill press and a 2500-lb. single-frame steam hammer. These are additions to the long list recently issued.

Denver & Rio Grande Western List

Wood-working Machinery

One belt-driven 20-in. hand-feed rip saw for pattern shop work.

One motor-driven 24-in. hand-feed rip saw.

One belt-driven 36-in. self-feed rip saw.

One motor-driven 36-in. hand-feed rip saw.

One belt-driven 36-in. power-feed rip saw.

One belt-driven standard rip saw table with 24-in. blade.

One motor-driven 36-in. cut off saw.

One motor-driven 36-in. automatic cut off saw.

One motor-driven 40-in. general purpose band saw.

One belt driven one-spindle vertical wood borer.

One belt-driven five-spindle vertical wood borer, angle attachment.

One belt-driven 36-in. band saw for pattern shop work.

One motor-driven No. 2 head, with upper head, sticker.

One belt-driven automatic saw setting and filing machine.

One motor-driven sander, 24 in. wide, for pattern shop.

Machine Tools

Three motor-driven 6-ft. triple purpose radial drills with boring bar and tapping attachment.

Two motor-driven 30-in. upright drill presses.

Four motor-driven 36-in. upright drill presses.

Two motor-driven 10-in. high speed sensitive drills.

Twelve 18-in. x 10-ft. engine lathes, of which two are to be belt-driven and the remainder motor-driven.

One motor-driven 18-in. x 10-ft. tool room engine lathe.

One motor-driven 20-in. x 10-ft. engine lathe.

One motor-driven 20-in. x 8-ft. tool room lathe.

Two motor-driven 48-in. x 20-ft. heavy duty engine lathes.

One motor-driven 14-in. x 4-ft. portable lathe.

Two motor-driven 14-in. heavy duty portable bolt lathes for 24-in. bolts.

Two motor-driven bench lathes with 8-in. swing.

One motor-driven centering machine.

Three motor-driven 3 x 36-in. horizontal turret lathes.

One 3¼ x 29-in. motor-driven horizontal turret lathe.

Two motor-driven 7 x 28-in. horizontal turret lathes.

One motor-driven 42-in. driving box horizontal turret lathe.

Four 42-in. vertical turret lathes, motor-driven.

Two motor-driven 16-in. brass lathes.

One motor-driven 42-in. coach wheel lathe.

One 79-in. driving wheel lathe.

Two motor-driven heavy duty 90-in. internal gear driving wheel lathes.

One motor-driven driving wheel quartering machine.

Two motor-driven double head heavy duty axle lathes.

Two motor-driven 84-in. 600-ton driving wheel presses.

One motor-driven 42-in. 400-ton car wheel press.

Two motor-driven heavy duty car wheel boring mills.

One motor-driven 5-in. forging machine.

One motor-driven 200-lb. helve power hammer.

One double frame 6000-lb. steam hammer.

Two oil-burning tire-testing furnaces, capacity up to 67-in. driver tires.

One oil-burning annealing furnace for rods and boiler plate, 8 ft. x 10 in.

One electric flue welder, capacity 2 to 5⅝ in. inclusive.

One electric rivet heater with five electrodes for rivets 1¼ to 9½ in.

Two electric rivet heaters with three electrodes for rivets ⅝ to 1 x 5¼ in.

One motor-driven spring forming machine, ⅝ x 7 in. x 72 in.

One pneumatic spring forming machine, ⅝ x 7 in. x 72 in.

Two hydraulic spring banding machines for locomotive driving springs.

One belt-driven 2½-in. pipe bending machine.

One portable air or steam-operated 2½-in. pipe bending machine.

One belt-driven pipe threader, capacity up to 4 in. with cutters with nipple attachment.

Three belt-driven pipe threaders, capacity up to 4 in. with cutters 1 to 4 in., arranged for cutters ½ and ¾ in.

Two belt-driven horizontal stay bolt threading machines, double head, lead screw range ½ to 1½ in.

One belt-driven 8-spindle nut tapper.

One belt-driven 6-spindle nut tapper.

Two belt-driven bolt cutters, capacity up to 2 in. with cutters 1¼ to 2 in. inclusive.

Eight double 16 x 2-in. emery wheels, one belt-drive and the others motor or belt-drive.

Three motor-driven 18 x 3-in. double emery wheels.

One motor-driven tool grinder for 2½ x 3 in. lathe tools.

Two motor-driven guide grinders, capacity of guides 5½ x 8½ x 104½ in.

Two motor-driven internal grinders for grinding holes 2⅝ in. in diameter and up to 18 in. long.

One motor-driven 44-in. car wheel grinding machine.

One belt-driven 3-in. twist drill grinder.

Two belt-driven grindstone frames with stones 36 in. in diameter.

Two motor-driven rotary splitting shears, capacity up to and including ⅝-in. plate.

One motor-driven bar shear, capacity 1½ in.

One motor-driven open throat single shear, capacity 1½-in. squares.

One belt-driven double punch and shear (for steel car work), capacity 1-in. steel plate; throat 60 in.

One motor-driven horizontal flange punch to punch 1¼-in. diameter through 1-in. steel.

One motor-driven boiler plate roll, capacity ⅝-in. plate, 18 ft. wide.

Two motor-driven friction saws, capacity 2⅛ in. sq., 3 in. diameter.

One motor-driven combination type cold saw, capacity 11 in. diameter, 10 in. sq.

One motor-driven vertical milling machine for rod work with 42-in. diameter table and extension support for arbor and crane.

One motor-driven vertical milling machine for rod work, 24 x 30 in. x 8 ft. with extension support and crane.

One motor-driven horizontal universal milling machine, range 50 x 14 in. x 20 in.

One motor-driven 24 x 24-in. x 8-ft. slab miller.

One motor-driven 20-in. crank shaper for tool room work.

One motor-driven 24-in. crank shaper for tool room work.

One motor-driven 48 x 48-in. x 10-ft planer.

One motor-driven 36 x 36-in. x 10-ft. planer.

One motor-driven die cutting machine.

One motor-driven 200,000-lb. capacity testing machine.

One belt-driven automatic six-spindle angle cock grinder.

One motor-driven three-head triple valve grinder.

One 20-in tin folder.

One 30-in. sheet iron folder.

Two motor-driven Morton, or equivalent, 32-in. special railroad draw cut shapers.

One motor-driven Morton, or equivalent, 32-in. draw cut shaper with standard equipment.

The Brenner, Moxley & Mervis Co., 954 West Twenty-first Street, Chicago, has let contract for a copper rod and wire mill, 102 x 303 ft., at 3436-52 South Kedzie Avenue, to cost $160,000.

The Walker Vehicle Co., 8700 South State Street, Chicago, has let contract for a one-story plant, 67 x 352 ft., at 1-57 West Eighty-seventh Street, to cost $90,000.

The Miehle Printing Press & Mfg. Co., Fourteenth and Robey Streets, Chicago, has let contract for a one-story power house, 30 x 60 ft., to cost $13,500.

The Realite Pencil Co., 3011 Montrose Avenue, Chicago, has bought the Autopoint Pencil Co., including the latter's plant at 4621 Ravenswood Avenue. It has changed its corporate style to the Autopoint Products Co. and has removed to the Ravenswood Avenue address, where it now has 20,000 sq. ft. of floor space as compared with 5000 sq. ft. at the former location. Its purchases of new equipment will be confined to a few machines to complete existing facility. Officers are C. R. Keeran, president; Frank C. Deli, vice-president; John P. Lynn, treasurer; and Michael M. Kaufmann, secretary.

The Specialty Mfg. Co., 123 South Jefferson Street, Chicago, recently incorporated with $25,000 capital stock, has taken over the business of the Hot P-Nut Machine Co. and the Krema Mfg. Co. The principal products are hot and cold P-Nut vending machines, match vending machines and target machines. The company has a plant at the address given and does not expect to purchase any metal working machines in the near future. Louis A. Neumann is president and J. A. Duckett, vice-president and secretary.

The A. V. Boetter Mfg. Co., Chicago, recently incorporated, has leased a two-story building at 612 South Canal Street and will manufacture lamp parts. Equipment has been installed. Officers are A. V. Boetter, president; H. A. Frahm, vice-president; and William Albrecht, secretary and treasurer.

The Waldorf Paper Products Co., St. Paul, Minn., has let contracts for an addition at 2230 Myrtle Avenue, to cost $150,000.

The Traction Foundry & Machine Co. plant, LaPorte, Ind., has been leased by the Lincoln Foundry Co., recently organized principally by men formerly connected with the American Brake Shoe & Foundry Co., Chicago. Officers of the new organization are Andrew A. Anderson, president; Thomas F. Lewis, treasurer; and A. F. Golich, secretary.

The Lindell Drop Forge Co., recently organized at Lansing, Mich., with $350,000 capital stock, will soon start the construction of a plant in that city.

The Cedar Falls Foundry Co., Inc., recently organized, plans to erect a foundry, 60 x 150 ft., on a site recently purchased on Bluff Street, Cedar Falls, Iowa. Hans Hansen is manager.

The Moore Speedcrane, Inc., Angola, Ind., recently organized with $225,000 capital stock, will manufacture Moore speedcranes, steam shovels, drag lines, dredges, ditching and sewer machinery. It is understood that plant space has been arranged for. Among those identified with the new company are Roy S. Moore of Angola, Oliver B. and Charles H. Moore and Walter C. Carlson of Chicago.

The Holland Foundry Co., which recently purchased a plant from the Holland Engine Co., Holland, Mich., is building an addition, 40 x 60 ft.

The Paul Foundry Co., Waterloo, Iowa, will build a new shop on a site recently purchased on Bluff Street.

The Greenduck Metal Stamping Co., manufacturer of metal advertising novelties, 2127 Tilden Avenue, Chicago, has purchased the J. L. Lynch Co., manufacturer of advertising buttons, Chicago.

The Chicago Automatic Tool Manufacturers, a new organization, is building a plant at 108th Street and Avenue O, Burnham, Ill., to manufacture tools, dies, jigs, etc. R. Lehnhoff is president.

The Public Service Co. of Northern Illinois, 72 West Adams Street, Chicago, is preparing plans for the construction of a dam and hydraulic power station at Aroma Park, Ill., on the Kankakee River, about four miles from Kankakee.

A manual training department will be installed in the new high school to be erected at LeMars, Iowa, estimated to cost $100,000. Beuttler & Arnold, Grain Exchange Building, Sioux City, Iowa, are architects.

The Allith-Prouty Co., Danville, Ill., has been organized under Delaware laws with capital of $500,000 to take over and expand the company of the same name for the manufacture of door hangers and hardware products.

The Curtis-Leger Fixtures Co., 115 West Jackson Boulevard, Chicago, manufacturer of metal store display fixtures, etc., will soon break ground for a six-story addition, 57 x 180 ft., estimated to cost $225,000, including machinery. F. M. Barton, 3426 South Kedzie Avenue, is architect. A. D. Curtis is president.

The New City Iron Works, 4847-59 South Racine Avenue, Chicago, will commence the erection of a one-story addition, 56 x 75 ft., for general iron-working.

A manual training department will be installed in the three-story addition to be erected at the junior high school, Boone, Iowa, estimated to cost $150,000, for which plans are being prepared by Dougher, Rich & Woodburn, Valley National Bank Building, Des Moines, Iowa.

The Rath Packing Co., Sycamore and Elm Streets, Waterloo, Iowa, will commence the erection of a five-story and basement ice-manufacturing and cold storage plant, 90 x 100 ft., estimated to cost $150,000, including machinery.

A manual training department will be installed in the new two-story high school to be erected at Slayton, Minn., estimated to cost $150,000, for which an architect will soon be selected.

Milwaukee

MILWAUKEE, May 14.

INDUSTRIAL demand for machine-tools is fairly well sustained, although the volume is mostly for replacement or to piece out equipment. Automotive industries are doing little at present, major needs apparently having been filled. Railroad inquiry is active and growing, but orders are slow in closing. Crane shops are busy and falling farther behind on deliveries. Structural fabricators for the most part are withdrawing from the market owing to the filled-up condition of shops. It is noticeable, however, that high prices are delaying some important projects, original bids being above appropriations or views, necessitating revisions of specifications. Milwaukee building permits are exceeding all previous high records, the issue on May 11 alone being in excess of $1,000,000.

The Gisholt Machine Co., Madison, Wis., has booked orders of considerable size for lathe controls from the Nash Motors Co., Kenosha and Milwaukee, the LaFayette Motors Corporation, Milwaukee, and the Packard Motor Car Co., Detroit.

The U. S. Tractor & Machinery Co., Menasha, Wis., heretofore manufacturing farm tractors exclusively, is doing some retooling to provide facilities for the production of automobiles, principally motorbus and motor truck chassis, it is understood. The corporate name was changed May 1 to the Wisconsin Automotive Corporation to better indicate the widened scope of the business. The manufacture of tractors will be continued. G. D. Harris is general manager.

The Kenosha, Wis., branch of the American Brass Co., subsidiary of the Anaconda Copper Co., has started work on a new mill for the production of copper and brass wire, which will constitute a new department at this plant. The building will be of brick and steel, two stories, 200 x 600 ft., and is being erected by the American Bridge Co. The estimated cost is $600,000. C. S. Judd is works manager.

A. P. Hauptman, 16 West Willow Street, Chippewa Falls, Wis., has broken ground for a new machine shop and smithy, 45 x 85 ft., costing about $12,000.

The Stoughton Wagon Co., Stoughton, Wis., manufacturing motor trucks and farm wagons, as well as commercial motor truck bodies, has leased a building at 959 McKey Boulevard, Janesville, Wis., adjacent to the plants of the Chevrolet Motor Co. and the Fisher Body Corporation, and is installing equipment for body manufacture. The output will be taken by the Fisher company to supply commercial car body needs of the Chevrolet works. C. H. Cox is general manager of the Stoughton works.

Philip Dean, 639 East Johnson Street, Madison, Wis., has plans for a $75,000 public garage and service building, tee-shaped, 66 x 224, part two stories, with basement, at South Webster and South Butler Streets, on which construction will start May 15.

The Schaefer Mfg. Co., Berlin, Wis., founder, machinist and builder of special machinery for vegetable and fruit canning factories, has acquired adjacent acreage and will build a machine-shop addition, 60 x 120 ft. Frank D. Chapman is president and general manager.

The A. O. Smith Corporation, Milwaukee, is erecting a new building, of brick and steel, to be used exclusively for the storage of pressed steel frames for motor vehicles, and having a capacity of 60,000 units at one time. Special monorail, crane and hoist equipment will be installed.

The Journal Printing Co., Stevens Point, Wis., publisher of *The Daily Journal*, will erect a new plant estimated to cost $50,000. Plans are being completed by Oppenhamer & Obel, architects, Green Bay and Wausau, Wis. New presses, typesetting machines and other equipment, with electric motor drive, will be purchased. E. C. Rogers is general manager.

A. L. Sweet, Madison, Wis., wholesale fruits and vegetables, plans to erect a new warehouse with cold storage plant and system, designed by R. A. Phillips, local architect, and costing about $45,000. Inquiry is being made for ice machine, engine, motors, etc.

The Metropolitan Sewerage Commission, 508 Market Street, Milwaukee, expects to receive specifications shortly for the maintenance building to serve the power plant and other buildings and equipment of the Jones Island sewage disposal plant, now under construction at a cost of $10,000,000. It will contain a large machine shop, equipped for all kinds of repair and replacement operation. The cost is roughly estimated at more than $200,000, including equipment. Work probably will begin shortly after July 1. Bids for machinery will be taken later. John H. Fowles is secretary of the commission.

Cincinnati

CINCINNATI, May 14.

BUYING has eased off within the past two weeks, but a fair number of orders are still being placed and indications are that during the next two or three weeks, with a large amount of railroad business to be closed, a return to the rate of March bookings will be seen. Local manufacturers are working on a large list issued by the Denver & Rio Grande Western Railroad, and an inquiry from the General Electric Co. also calls for a considerable number of machine tools. The Louisville & Nashville bought a few small tools, and the Chicago & North Western is expected to commence purchasing this week. Buying from the automobile industry continues in fair volume. An Indiana manufacturer bought four small engine lathes. The greater number of orders, however, continues to be for one and two machines. A local engine lathe builder reports the receipt of an order for two heavy machines for Rio Janeiro and one for Guatemala.

Due to increasing costs, engine lathe manufacturers have advanced prices from 5 to 15 per cent, effective at once. A local manufacturer who is now employing nearly one hundred men reports that in order to hold them he was forced to advance 60 per cent of the force from 5c. to 12c. per hr. in April.

A number of German mechanics, formerly with the Krupp Works, have arrived in this country and are now employed in several machine tool factories. These workmen are unusually competent and are well satisfied with the wages paid and conditions in American shops. It is expected that there will be quite an influx of these men during the next few months, as those now here are writing friends in Germany of the opportunities for securing lucrative employment in American shops.

Fire at the plant of the Hill & Griffith Co., Evans Street, Cincinnati, May 11, caused $100,000 damage. The company manufactures foundry supplies and less than a month ago its State Avenue plant was destroyed, with a loss of $100,000. Plans for rebuilding have not been completed.

The Ziegler Mfg. Co., Alexandria, Ind., manufacturer of die stamping machines and machine tool accessories, has been purchased by a group of Terre Haute, Indianapolis and Wheeling business men. The company was owned by Joseph Ziegler, Anderson, Ind., who will retire. Henry K. Dalzell, Terre Haute, is president of the new company, and Fred Millis, Indianapolis, secretary-treasurer.

The Buckeye Incubator Co., Springfield, Ohio, has let contract for a new plant to replace the one destroyed by fire several weeks ago. It will be two stories, 40 x 180 ft. Considerable equipment will be purchased.

The city of Columbus, Ohio, contemplates the expenditure of $235,000 for improvements and additions to its municipal light plant.

Simpson Brothers, Portsmouth, Ohio, have awarded contract for rebuilding their general machine shop recently destroyed by fire. It will be 40 x 140 ft., and considerable new equipment, including lathes, drills and shapers, has been purchased.

Indiana

INDIANAPOLIS, May 14.

THE Universal Radiator & Sheet Metal Co., Indianapolis, is arranging for a new plant at Walnut and Illinois Streets to manufacture automobile radiators, etc.

The Patoca Furniture Mfg. Co., Huntingburg, Ind., has tentative plans for the erection of a new factory, to cost $100,000 including machinery. L. J. Hoing heads the company.

The Fay Mendenhall Electric Co., 44 West South Street, Indianapolis, manufacturer of electrical equipment, has plans for additions and the installation of new equipment.

Swisshelm & Parker, 330 East Market Street, Indianapolis, manufacturers of automobile bodies, have leased the building at 542-46 East Washington Street, 50 x 195 ft., and will remodel the structure for a new plant.

A manual training department will be installed in the new high school to be erected at Sullivan, Ind., estimated to cost $150,000, for which an architect will be selected to prepare plans at an early date.

The Fonts Car & Tractor Co., 2549 West Michigan Street, Indianapolis, has awarded contract to the Ostrom Realty Co., People's Bank Building, for a one-story and basement plant, 68 x 178 ft., at West Washington and Belmont Streets, estimated to cost $35,000. E. D. Fonts is head.

The Auto Specialties Co., 216 Tyler Avenue, Elkhart, Ind., manufacturer of battery equipment and kindred products, will erect a new one-story and basement works, 78 x 95 ft. V. G. Crawley is head.

The Peterson Storage Battery Co., 323 South Lafayette Street, South Bend, Ind., has awarded a contract to the Kuehn-Jordan Co., 401 North Notre Dame Street, for a one-story addition to cost $30,000.

A power house will be constructed by the Board of County Commissioners, Fort Wayne, Ind., in connection with a new court house, estimated to cost $600,000, for which bids are being taken.

The Gulf States

BIRMINGHAM, May 14.

A POWER house, machine shop and other mechanical buildings will be erected at the new plant of the Dallas Textile Mills Co., Dallas, Tex., recently organized, on site acquired in the Love Field industrial district, for which ground will be broken at once. It will cost about $1,000,000 with machinery. J. Perry Burrus is president. Robert & Co., Atlanta, Ga., are engineers.

The Dallas Power & Light Co., Dallas, Tex., has plans for a new electric generating house on Griffin Street, 92 x 160 ft., estimated to cost $400,000, with machinery.

R. E. Boggs, 1315 Jefferson County Bank Building, Birmingham, machinery dealer, is in the market for one 300-kw. turbo-generator, complete with condenser and auxiliary equipment; also, for two industrial locomotives, 15 to 25 tons, each, standard gage, and one air compressor, belt-driven, 500 to 600 ft. capacity.

The City Council, Granbury, Tex., has plans under way for a new municipal electric power house. A waterworks plant with electrically-operated pumping machinery will also be built. The project will cost about $100,000.

The Transcontinental Oil Co., Fort Worth, Tex., will make extensions in its oil refinery, including the installation of a new gasoline refining department, stills, power equipment, etc., estimated to cost $500,000 with machinery. Headquarters of the company are at Pittsburgh.

Wells, Stillwell & Spears, El Paso, Tex., are perfecting plans for a cottonseed oil mill, with power house, machine shop and other buildings. All machinery will be electrically operated. The plant will cost $125,000.

M. C. McAdams, Millport, Ala., is organizing a company to build an ice-manufacturing and refrigerating plant to cost $50,000.

The Common Council, Greenville, Fla., is perfecting plans for the installation of a municipal electric light and

power house. A waterworks with electrically-operated pumping machinery will also be built.

The Marland Refining Co., Texas City, Tex., is planning the erection of a new oil refinery, to cost close to $300,000 with machinery. The company is now building a storage and distributing plant.

A manual training department will be installed in the new high school to be erected at Bonham, Tex., by the Fannin County Board of School Trustees, estimated to cost $125,000, for which plans will soon be prepared.

The Myer-Spalti Mfg. Co., Houston, Tex., manufacturer of concrete products, has plans for the erection of new works, estimated to cost $150,000 including machinery.

The Texhoma Oil & Refining Co., Wichita Falls, Tex., has plans for the construction of a new gasoline refinery in the vicinity of Fort Worth, Tex., comprising four units, estimated to cost $500,000, with machinery. A power house will also be built. W. B. Hamilton is president.

The Light and Water Department, Sebring, Fla., will take bids at once for equipment for a municipal light and power plant, including boilers and auxiliary apparatus, pumping equipment, tanks, electrical apparatus, etc., as per specifications on file.

The Missouri, Kansas & Texas Railway Co., St. Louis, will commence the complete electrification of its car and locomotive shops at Bellmead, Tex., to include the installation of a power house, motors, transformers and auxiliary apparatus. It will cost in excess of $100,000.

A manual training department will be installed in the high school to be erected at Eagle Lake, Tex., estimated to cost $150,000, for which plans will soon be prepared.

A manual training department will be installed in the new high school to be erected at Aberdeen, Miss., estimated to cost $125,000, for which plans are being drawn by R. A. Heavner, Jackson, Miss., architect.

The Temple Lumber Co., Hemphill, Tex., has work in progress on a new mill, estimated to cost $250,000 with machinery. The equipment will be electrically-operated. The mill will replace a plant destroyed by fire several months ago.

The Gulf States Simplex Rim Co., San Antonio, Tex., recently incorporated to manufacture automobile rims, is putting in a converting plant and expects to be in operation in about two months. It is now ready to receive quotations on additional machinery. E. M. Crane is president.

The Weldmech Co., Hattiesburg, Miss., recently incorporated with capital stock of $30,000 is a change from a co-partnership acting as welding and mechanical engineers. The company will be in the market for electric welding equipment in the near future. S. E. Travis, Jr., heads the company.

The Central South

ST. LOUIS, May 14.

PLANS are being completed by the Great Western Smelting & Refining Co., 3110 North Broadway, St. Louis, for a two-story foundry, 100 x 400 ft., for brass and white metal castings, estimated to cost $100,000 with equipment. J. M. Hirschstein, 5777 DeGiverville Avenue, is architect.

The Oklahoma Power Co., Okmulgee, Okla., is planning for a hydroelectric generating house on the Kiamichi River, near Antlers, Okla., to cost about $500,000 with machinery. C. H. Kretz is president.

The Marquette Cement Mfg. Co., 140 South Dearborn Street, Chicago, has acquired the plant of the Cape Girardeau Portland Cement Co., Cape Girardeau, Mo., for a reported price of $2,000,000. The new owner plans to increase the capacity and install additional machinery.

The Marland Refining Co., Ponca City, Okla., is planning to rebuild the portion of its works recently destroyed by fire with loss estimated at $30,000.

The Paducah Electric Co., Paducah, Ky., is contemplating extensions and improvements in its generating plant, to include the installation of a 2500 kw. turbo-generator, boilers, coal-handling machinery and auxiliary equipment, estimated to cost $300,000. A bond issue of $1,006,000 is being sold.

The Sibbitt Iron & Foundry Co., 217 Moore Avenue, Wichita, Kan., has awarded a general contract to John M. Denny, 1451 North Lawrence Street, for a one-story addition to double the present capacity. A traveling crane will be installed. Benjamin Sibbitt is head.

The A. Leschen & Sons Rope Co., 5909 Kennerly Avenue, St. Louis, has awarded contract to James Stewart & Co., Boatmen Bank Building, for a one-story addition to cost $100,000. A portion of the structure will be equipped as a testing laboratory.

The Barnsdall Refining Co., Barnsdall, Okla., will install eight additional units at its refinery at a cost of $200,000.

The Missouri Water Power Co., Lebanon, Mo., is planning the construction of four hydroelectric power plants on the Niagua River. Work has commenced on the first unit, to have a capacity of about 2500 hp.

A manual training department will be installed in the high school to be erected at Excelsior Springs, Mo., estimated to cost $150,000, to be taken from a bond issue of $215,000. An architect will soon be selected.

The Bochaus Machine & Welding Co., 116 East Third Street, Newton, Kan., plans the installation of a power cylinder grinder and other equipment.

The Elmira Coal Co., Elmira, Mo., plans the installation of electric power and mining equipment on 1200 acres of coal land recently acquired. The company was lately organized with A. G. Widmer, Elmira, president.

A manual training department will be installed in the new high school to be erected at Cushing, Okla., estimated to cost $100,000. J. O. Bradley & Co., Post Office Building, Pawhuska, Okla., are architects.

The Waggoner-Gage Corporation, Blytheville, Ark., plans the erection of a new cottonseed oil mill with power house, estimated to cost $250,000 with machinery.

The Polar Wave Ice Co., 3626 Olive Street, St. Louis, has plans for the erection of a new ice-manufacturing and cold storage plant at Moberly, Mo., estimated to cost $250,000 with machinery.

A manual training department will be installed in the new high school to be erected at Guthrie, Okla., estimated to cost $150,000, for which plans will be prepared at once.

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Allis-Chal. pf...	93	93	Int. Har. pf....	112	112
Am. B. S. & Fdy.	73	76½	Lima Loco.	64⅛	69⅛
Am. B.S. & F. pf.	108¾	108¾	Midvale Steel ..	26¼	30¼
Am. Can	85¼	94¾	Nat.-Acme	14⅝	14½
Am. Can pf.....	108½	108⅞	Nat. En. & Stm.	63¾	67
Am. Car & Fdy..	167	175	Nat. En. & S. pf.	98	98
Am. C. & F. pf..	119¼	121	N. Y. Air Brake.	34	38¼
Am. Loco.	125¾	139⅛	Nova Scotia Stl..	22½	22½
Am. Loco. pf...	116	116	Otis Steel	9¼	10⅝
Am. Radiator ..	80⅛	83	Otis Steel pf....	53¼	56
Am. Steel Fdries.	36⅝	38¾	Pressed Steel ..	59	61
Am. Stl. Fd. pf..	100	100½	Replogle Steel...	18¼	22
Bald. Loco.	123⅜	131⅝	Republic	48¾	54⅞
Bald. Loco. pf..	112	112	Republic pf. ...	91¼	93
Beth. Steel	53	60¾	Sloss	51	55¾
Beth. Stl. 8% pf.	107⅛	108½	Sloss pf.	80	80
Br. Em. Steel...	7½	7½	Steel of Canada.	73½	76¾
Br. Em. Stl. 2 pf.	19	20½	Superior Steel...	30¼	31
Chic. Pneu. Tool	77	82	Transue-Wms. ..	36	37⅝
Colo. Fuel	28	30½	Un. Alloy Steel..	35½	35⅞
Crucible Steel ..	66½	72⅝	U. S. Pipe.....	24	27
Crucible Stl. pf..	89⅞	90	U. S. Pipe pf....	65	66
Deere pf.	71	71	U. S. Steel.....	97¼	102
Gen. Electric ...	172⅞	177½	U. S. Steel pf...	116⅜	118
Gt. No. Ore Cert.	29½	30½	Vanadium Steel.	31¼	34⅝
Gulf States Steel	81½	88½	Va. I., C. & Coke	61	63
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The Timken Roller Bearing Co., Detroit, has declared a quarterly dividend of 75c. on stock of record May 19.

The Studebaker Corporation, Detroit, reports the most profitable first quarter in its history, net profits from the sale of 38,211 cars aggregating $6,170,971, as compared with sales of 22,801 in the first quarter of 1922, profits of $4,069,848. The balance sheet, as of March 31, shows assets of $116,393,216, or an increase of $1,762,427 over December, 1922. Surplus was $14,005,857, against $10,237,189.

power house. A waterworks with electrically-operated pumping machinery will also be built.

The Marland Refining Co., Texas City, Tex., is planning the erection of a new oil refinery, to cost close to $300,000 with machinery. The company is now building a storage and distributing plant.

A manual training department will be installed in the new high school to be erected at Bonham, Tex., by the Fannin County Board of School Trustees, estimated to cost $125,000, for which plans will soon be prepared.

The Myer-Spalti Mfg. Co., Houston, Tex., manufacturer of concrete products, has plans for the erection of new works, estimated to cost $150,000 including machinery.

The Texhoma Oil & Refining Co., Wichita Falls, Tex., has plans for the construction of a new gasoline refinery in the vicinity of Fort Worth, Tex., comprising four units, estimated to cost $500,000, with machinery. A power house will also be built. W. B. Hamilton is president.

The Light and Water Department, Sebring, Fla., will take bids at once for equipment for a municipal light and power plant, including boilers and auxiliary apparatus, pumping equipment, tanks, electrical apparatus, etc., as per specifications on file.

The Missouri, Kansas & Texas Railway Co., St. Louis, will commence the complete electrification of its car and locomotive shops at Bellmead, Tex., to include the installation of a power house, motors, transformers and auxiliary apparatus. It will cost in excess of $100,000.

A manual training department will be installed in the high school to be erected at Eagle Lake, Tex., estimated to cost $150,000, for which plans will soon be prepared.

A manual training department will be installed in the new high school to be erected at Aberdeen, Miss., estimated to cost $125,000, for which plans are being drawn by R. A. Heavner, Jackson, Miss., architect.

The Temple Lumber Co., Hemphill, Tex., has work in progress on a new mill, estimated to cost $250,000 with machinery. The equipment will be electrically-operated. The mill will replace a plant destroyed by fire several months ago.

The Gulf States Simplex Rim Co., San Antonio, Tex., recently incorporated to manufacture automobile rims, is putting in a converting plant and expects to be in operation in about two months. It is now ready to receive quotations on additional machinery. E. M. Crane is president.

The Weldmech Co., Hattiesburg, Miss., recently incorporated with capital stock of $30,000 is a change from a co-partnership acting as welding and mechanical engineers. The company will be in the market for electric welding equipment in the near future. S. E. Travis, Jr., heads the company.

The Central South

ST. LOUIS, May 14.

PLANS are being completed by the Great Western Smelting & Refining Co., 3110 North Broadway, St. Louis, for a two-story foundry, 100 x 400 ft., for brass and white metal castings, estimated to cost $100,000 with equipment. J. M. Hirschstein, 5777 DeGiverville Avenue, is architect.

The Oklahoma Power Co., Okmulgee, Okla., is planning for a hydroelectric generating house on the Kiamichi River, near Antlers, Okla., to cost about $500,000 with machinery. C. H. Kretz is president.

The Marquette Cement Mfg. Co., 140 South Dearborn Street, Chicago, has acquired the plant of the Cape Girardeau Portland Cement Co., Cape Girardeau, Mo., for a reported price of $2,000,000. The new owner plans to increase the capacity and install additional machinery.

The Marland Refining Co., Ponca City, Okla., is planning to rebuild the portion of its works recently destroyed by fire with loss estimated at $30,000.

The Paducah Electric Co., Paducah, Ky., is contemplating extensions and improvements in its generating plant, to include the installation of a 2500 kw. turbo-generator, boilers, coal-handling machinery and auxiliary equipment, estimated to cost $300,000. A bond issue of $1,006,000 is being sold.

The Sibbitt Iron & Foundry Co., 217 Moore Avenue, Wichita, Kan., has awarded a general contract to John M. Denny, 1451 North Lawrence Street, for a one-story addition to double the present capacity. A traveling crane will be installed. Benjamin Sibbitt is head.

The A. Leschen & Sons Rope Co., 5909 Kennerly Avenue, St. Louis, has awarded contract to James Stewart & Co., Boatmen Bank Building, for a one-story addition to cost $100,000. A portion of the structure will be equipped as a testing laboratory.

The Barnsdall Refining Co., Barnsdall, Okla., will install eight additional units at its refinery at a cost of $200,000.

The Missouri Water Power Co., Lebanon, Mo., is planning the construction of four hydroelectric power plants on the Niagua River. Work has commenced on the first unit, to have a capacity of about 2500 hp.

A manual training department will be installed in the high school to be erected at Excelsior Springs, Mo., estimated to cost $150,000, to be taken from a bond issue of $215,000. An architect will soon be selected.

The Bochaus Machine & Welding Co., 116 East Third Street, Newton, Kan., plans the installation of a power cylinder grinder and other equipment.

The Elmira Coal Co., Elmira, Mo., plans the installation of electric power and mining equipment on 1200 acres of coal land recently acquired. The company was lately organized with A. G. Widmer, Elmira, president.

A manual training department will be installed in the new high school to be erected at Cushing, Okla., estimated to cost $100,000. J. O. Bradley & Co., Post Office Building, Pawhuska, Okla., are architects.

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Earnings of the Willys-Overland Co., Toledo, Ohio, for the first quarter amounted to $2,729,469. During the period 39,030 cars were sold, and April sales will total 20,000 vehicles. Mr. Willys estimated that 1000 cars per day would be made and sold during May. The report shows that since March 31, when the bonded indebtedness of the company was $14,059,000, two payments have been made, reducing this item to $6,943,000.

The Timken Roller Bearing Co., Detroit, has declared a quarterly dividend of 75c. on stock of record May 19.

The Studebaker Corporation, Detroit, reports the most profitable first quarter in its history, net profits from the sale of 38,211 cars aggregating $6,170,971, as compared with sales of 22,801 in the first quarter of 1922, profits of $4,069,848. The balance sheet, as of March 31, shows assets of $116,393,216, or an increase of $1,762,427 over December, 1922. Surplus was $14,005,857, against $10,237,189.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.80c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c. to 4.65c.
Squares, flats and hex	4.90c. to 5.15c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.90c. to 5.05c.	.....
Nos. 22 and 24	4.95c. to 5.10c.	5.60c.
No. 26	5.00c. to 5.15c.	5.65c.
No. 28	5.10c. to 5.25c.	5.75c.
No. 30	5.30c. to 5.45c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	5.20c. to 5.35c.
No. 16	5.35c. to 5.50c.
Nos. 18 and 20	5.50c. to 5.65c.
Nos. 22 and 24	5.65c. to 5.70c.
No. 26	5.80c. to 5.95c.
No. 27	5.95c. to 6.10c.
No. 28	6.10c. to 6.25c.
No. 30	6.60c. to 6.75c.

No. 28 and lighter, 36 in. wide, 20c. higher

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt..	—44	—29	½ in. Butt..	— 4	+19
¾ in. Butt..	—49	—36	¾ in. Butt..	—11	+ 9
1-3 in. Butt..	—52	—33	1-1½ in. Butt	—14	+ 6
2½-6 in. Lap.	—48	—35	2 in. Lap....	— 5	+14
7-8 in. Lap..	—44	—17	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap.	—38	—14	7-12 in. Lap..	— 3	+16

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	21⅞c. to 22⅞c.
High brass wire	22⅜c. to 23⅜c.
Brass rods	19⅛c. to 20⅛c.
Brass tube, brazed	28⅞c. to 29⅞c.
Brass tube, seamless	25⅛c. to 26⅛c.
Copper tube, seamless	27¾c. to 28 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 25½c. to 26½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
		Prime	Seconds
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb..	$6.30 $6.05
		90 lb..	6.40 6.15
		100 lb..	6.50 6.25
IC..	$11.00 $9.75	IC..	6.65 6.40
IX..	12.25 11.00	IX..	7.65 7.40
IXX..	13.50 12.25	IXX..	8.65 8.40
IXXX..	14.75 13.50	IXXX..	9.65 9.40
IXXXX..	16.50 14.75	IXXXX..	10.65 10.40

Terne Plates

8-lb. coating, 14 x 20

100 lb	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	48c.
Bar	55c. to 60c.

Copper

Lake ingot	18¾c.
Electrolytic	18 c.
Casting	17¾c.

Spelter and Sheet Zinc

Western spelter	8 c.
Sheet zinc, No. 9 base, casks	10¾c. open 11¼c.

Lead and Solder*

American pig lead	8¾c. to 9¼c.
Bar lead	12c. to 13c.
Solder, ½ and ½ guaranteed	33½c.
No. 1 solder	31½c.
Refined solder	28c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	9c. to 9½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	32c. to 33c.

Old Metals

The market continues to decline. There is such a wide difference of opinion as to prices that business is practically nil. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	13.50
Copper, heavy wire	12.50
Copper, light and bottoms	10.75
Brass, heavy	7.25
Brass, light	6.00
Heavy machine composition	10.25
No. 1 yellow brass turnings	7.75
No. 1 red brass or composition turnings	9.00
Lead, heavy	6.00
Lead, tea	4.50
Zinc	4.25